NATIONAL INSTITUTE OF IMMUNOLOGY

ANNUAL REPORT
2019-20

NATIONAL INSTITUTE OF IMMUNOLOGY

ANNUAL REPORT
2019-20

CONTENTS

Mandate of the Institute	1
Foreword	3
Research Reports	8
Publications	19
Patents	25
Ph.D Degrees Awarded	26
Distinctions/Honours/Fellowships	28
Invited Lectures and Seminars	32
Conference/Symposia/Workshops	37
MoUs and Visitors	40
Support Units	42
Summary of Notable Activities	47
Cases under 'Right To Information Act'	50
Committees	52
Staff and Students	58
Budget, Finance, Auditor's Report and Audited Accounts	63

MANDATE OF THE INSTITUTE

- To undertake, aid, promote, guide and co-ordinate research of high calibre in basic and applied immunology
- To carry out research for development of new vaccines and immunological reagents for communicable diseases
- To develop immunological approaches for regulation of male and female fertility
- To interact with industry for manufacture of vaccines and immunological reagents
- To organise postgraduate courses, workshops, seminars, symposia and training programmes of a specialized nature in the field of immunology, vaccine development and related areas
- To organise training programmes for technicians in immunological methods and related techniques
- To establish affiliation with recognised universities and institutions of higher learning for the purpose of enabling research scholars to register for postgraduate degrees
- To serve as a national reference centre for immunology and to provide consultancy services to medical and veterinary institutions, public health agencies and industries in the country
- To provide and promote effective linkages on a continuing basis between various scientific and research agencies/laboratories and other organisations working in the country in the field of immunology, vaccine development and related areas
- To collaborate with foreign research institutions, laboratories and other international organisations in fields relevant to the objectives mentioned above

FOREWORD

It has been an interesting year, full of exciting discovery. As always, it is a pleasure and privilege to present the Annual Report of the Institute. I am fortunate to be associated with a bunch of energetic and capable colleagues; their commitment to the ideals of scientific rigor and excellence is what drives the Institute forward. Our students are the best and brightest; their dynamism and passion is a critical ingredient in our intellectual pursuits, and of campus life.

While our interests are broad, and encompass large areas of the biological sciences, we lay special emphasis on immunology; we believe this institutional characteristic, carefully and intentionally nurtured by preceding Directors over the years, bestows upon us unique, multi-dimensional strengths. Needless to say, it is a characteristic we feel proud of.

While on-going programmes have kept us busy, the SARS-CoV-2 pandemic has thrown up sudden challenges and unique opportunities. Benefitting from our inherent institutional strength and expertise, several of us have embarked upon the design and evaluation of a protein-based vaccine; initiatives in drug discovery are also underway.

As our understanding of immunology broadens, we increasingly imbibe the tools and techniques of physical and engineering science. In order to fully exploit the potential of such cross-fertilization, it is our endeavour to also adopt the methods of precision analysis and quantitative determination that characterize those disciplines. As we enter into the realm of ImmunoEngineering, these skills will help us achieve our societal goals.

Here is a brief compendium of our research pursuits over the course of the year.

Biophysics and Molecular Design

Computational approaches to ascertain biomolecular structure and determine substrate specificity are being developed, and exploration of their applicability in the identification of novel biosynthetic pathways and regulatory networks continues. Ribosomally-synthesized, post-translationally modified peptides (RiPPs) constitute a large class of natural bacterial products of diverse structure and bioactivity. RiPPMiner, developed earlier, used a machine learning approach to predict RiPP class, leader cleavage sites and cross-linked chemical structures of RiPPs, utilizing only the sequence of the precursor peptide as input. RiPPMiner-Genome, a significantly updated version of RiPPMiner, takes genomic sequences as input and identifies RiPP biosynthetic gene clusters and modifying enzymes, significantly enhancing the accuracy of RiPP chemical structure prediction.

The process of developing tools to understand the structure and function of glycoconjugates in living systems has been carried forward. Earlier studies demonstrated the ability of peracetyl *N*-thioglycolyl-D-galactosamine (Ac_5GalNTGc) to inhibit mucin type *O*-glycosylation (MTOG) in Jurkat, K562 and U937 cells. Significantly, Ac_5GalNTGc was shown to inhibit MTOG in murine primary T-cells as well. Inhibition of MTOG on CD43 affected its exclusion from the immunological synapse; consequential effects on immune activation or suppression are being explored.

Investigations into the structure-function relationship of glycolytic enzymes in *Mycobacterium tuberculosis* are underway. Atomic level details of enolase (an essential enzyme for mycobacterial growth and virulence) were deciphered, both in native and substrate-bound form. Structural and biochemical studies are providing insights into mechanism of action; emerging data may assist in the design of specific inhibitors.

The methods of structural biology are being employed to study the behaviour of *Leishmania* phosphoglycerate kinase isoforms. The relevance of information theory in the study of protein folding is being explored. The understanding of protein-ligand interactions of relevance to fatty acid metabolism in *Leishmania* has advanced. AutoDock was employed to screen NCI small molecule libraries; two inhibitors, effective

against promastigotes, axenic amastigotes, as well as intracellular amastigotes, were identified.

Work into understanding the mechanisms of GTP catalysis by GTPases has continued. Along with structural data, these analyses could provide insights into drug design. Chimeric constructs of hGBP-1 and hGBP-2 have helped discern why hGBP-1 induces a relatively lower amount of GMP upon GTP catalysis. Data indicates that, compared with hGBP-1, reduced levels of GMP may be a result of differences in the re-adjustment of the active site after the first phosphate cleavage of GTP.

Transpeptidase sortases are being investigated for their utility in mediating peptide ligation for the semi-synthesis of proteins. Sortase-mediated semi-synthesis of histones, carrying site-specific acetylation of Lys-5 and Lys-4 in H2B (H2BK5Ac) and H3 (H3K4Ac) respectively, was carried out with a view to define the specificity of histone deacetylases (HDACs). Data indicates that HDAC1 preferentially deacetylates H2BK5Ac.

Cancer Biology and Chronic Diseases

Using *Caenorhabditis elegans* as a model system, signalling events that culminate in altered gene expression during the aging process are being deciphered. Dietary restriction is known to increase life span and delay age-onset diseases; the cascade of molecular events leading to such outcomes is being delineated.

Molecular pathways involved in tumor cell growth, migration and invasion are being delineated, with specific focus on the tumor-associated antigens SPAG9, AKAP4 and HSP70-2. On-going Phase II clinical trials aim to assess the effects of the administration of autologous dendritic cells (primed with recombinant SPAG9 protein) in patients of cervical cancer; trials in patients of ovarian cancer are also on the anvil.

Work on extending understanding of the function of tumor suppressor genes has continued. ACLY was identified as a Caspase-10 interacting protein; cleavage of ACLY abrogates its enzyme activity, suppressing the generation of acetyl-CoA, which is critical for lipogenesis and histone acetylation. In an *in vivo* model, Caspase-10 was shown to down-regulate ACLY-promoted tumor metastasis.

Identifying the underlying mechanisms which drive pathogenesis in neurological disorders has proceeded apace. Exposure to low doses of Bisphenol A (the endocrine-disrupting chemical employed in the manufacture of polycarbonate plastics and epoxy resins) caused neuronal degeneration and demyelination, a finding that has implications in multiple sclerosis and neuromyelitis optica. AdipoRon (an adiponectin agonist) was shown to augment brain insulin sensitivity, reduce Aβ42 accumulation and improve cognitive function in APP/PS1 mice.

The processes responsible for inhibition of DNA replication during stress are being elucidated; unravelling of such regulatory mechanisms is likely to cause genomic instability. Gene targets of lncRNAs dysregulated in cancer are being identified and their influence on the cell cycle is being established.

Bloom Syndrome and Rothmund-Thomson Syndrome are associated with germline mutations in BLM and RECQL4 helicases, respectively; tumorigenesis is a characteristic of both syndromes. Several substrates of the BLM-interacting E3 ligase FBW7 are proto-oncogenes which have been implicated in human cancers. Previous work has found that BLM promotes the FBW7-dependent degradation of c-Myc, affecting tumor initiation. FBW7α was also found to degrade p53 via the proteasomal pathway, affecting its function during DNA damage.

Cell and Molecular Biology

Signaling pathways which mediate cell death in eukaryotic cells are being elucidated. Stimuli like starvation, oxidative stress and drugs were shown to enhance autophagy in the *Leishmania* parasite; the ability to counteract such stress appears to be dependent on Atg8. An analogue of Halictine-2 (an antimicrobial peptide from the venom of the eusocial honey bee) was shown to demonstrate high anti-leishmanial activity, raising the possibility of its use as a drug.

Disruption of the regulation between protein homeostasis and energy metabolism occurs in many diseases, though mechanisms remain obscure. The mTORC1 pathway was shown to be involved in determining the levels of resting-state protein

synthesis in B cells. Vitamin D was demonstrated to regulate energy metabolism and protein homeostasis in skeletal muscles; in Vitamin D receptor knockout mice, a dysregulation of the mTOR pathway correlated with muscle atrophy.

The DNA binding protein CTCF contributes to chromatin organization. Mice carrying mutations in various CTCF binding sites have been generated in order that cooperation and/or redundancy can be evaluated; initial analysis has revealed altered usage of V segments during V-to-DJ recombination. Work on elucidating the activity of the enhancer Eb (an important regulatory element of the TCRb locus) has also been initiated.

Study of the processes of cellular differentiation and reprogramming continue; besides shedding light on basic biology, such work will assist in the development of novel therapeutics. Amongst other work, early transfer of "reprogrammed monocytes" into mice who have undergone cecal ligation and puncture (an established model of sepsis) was shown to enhance survival.

Contraceptive vaccines are being evaluated for the management of street dog populations. A recombinant protein (comprising a T cell epitope of TT, a fragment of dog ZP3, a T cell epitope of bovine RNase, GnRH, a T cell epitope of *Plasmodium falciparum* CSP, and another copy of GnRH) induced anti-fertility effects when immunized in female beagle dogs.

Using transcriptomics, proteomics and bioinformatics, factors in Sertoli cells that regulate germ cell division and differentiation are being elucidated; such work could shed light on the causes of idiopathic male infertility. A role of the Hippo transducer YAP in regulation of the c-AMP and Notch signaling pathways in functionally mature Sertoli cells has been demonstrated. Data also suggests that YAP regulates TLR-2 signaling in Sertoli cells.

Immunology and Vaccines

Use of antigen-entrapped polymer particles to enhance immunogenicity has been a long-standing interest; current studies focus on protein and carbohydrate antigens of *S. pneumoniae* and *S. typhi*. Immunogenicity studies of particle-entrapped SP0845-PCP1 conjugate are in progress. Preliminary evidence suggests that nanoparticle-based immunization enhances the germinal centre reaction.

Infection with closely-related *Salmonella* serovars is associated with distinct clinical outcomes in both mice and humans, the reasons for which are incompletely understood. In a murine model, two observations were of interest. Firstly, MyD88 was required for inflammatory responses to metabolically-active *S.*Typhi, but was largely dispensable for antibody responses. Secondly, *Salmonella* infection transiently suppressed antibody responses to unrelated antigens, a fact that has implications for vaccines employing adjuvants which seek to heighten MyD88-dependent effects.

Exploration of *Streptococcus pneumoniae*-host cell interaction has continued. PCP1 was shown to induce phosphorylation of ERK in RAW264.7 cells, acting via TLR-2. *O*-acetylation on PCP-1 was critical for cell binding, and deacetylation affected the molecule's immunogenicity. In other work, a uracil transporter was demonstrated to be required for pneumococcal fitness and virulence.

The role follicular T helper (Tfh) cells play in protective immunity is being assessed. Upon immunization of mice with the Japanese encephalitis (JE) vaccine, CD8 T cells were required for Tfh differentiation, as well as for the generation of optimal protective antibody responses. In humans immunized with the live attenuated JE-vaccine, the frequency of activated Tfh cells correlated with the magnitude of antibody-forming cells, reiterating their influence on the generation of protective humoral immunity.

Studies on elucidating the development and function of dendritic cells were carried forward. A novel role for RELB as a negative regulator of the type I IFN signaling pathway was described. Expression of RELB in FLT3-ligand derived DCs (which normally express low levels of RELB) reduced expression of CpG-stimulated *Ifna, Ifnb, Il12p40* and *Tnfa* transcripts. Further, RELB-expressing NIH3T3 cells exhibited lower transcript levels of interferon-stimulated genes upon viral infection.

Systemic autoimmune diseases like SLE (or lupus) occasionally "flare" during pregnancy. In a possible

explanation of this association, apoptotic blebs (implicated in lupus onset) were shown to synergize with human chorionic gonadotropin (hCG, a pregnancy-associated hormone) in the elicitation of lupus-associated inflammatory cytokines and autoantibodies specifically in splenocytes cultures from lupus-prone mice. Previous work had indicated that hCG also exhibits pro-tumorigenic activity; emerging observations in transgenic mice suggest that ovarian steroids help ameliorate such effects.

Cross-talk of non-canonical NF-κB signaling pathway with the canonical NF-κB signaling pathway, and with the IRF3-type 1 interferon axis, is being elucidated. The canonical RelA NF-κB pathway was found to exert a pro-viral role during infection, arising from the ability of RelA to suppress cell death. Further, whether non-canonical NF-κB signaling influenced TNF-induced gene expression was assessed, employing microarray analysis on specific NF-κB component-deficient mouse embryonic fibroblasts. Data suggests that the p100 subunit modified transcriptional responses to TNF via both RelA- as well as RelB-dependent mechanisms.

CD4 cytotoxic T cells mediate protective roles in several viral infections. Long-term culture of human T cells under a Th1 polarizing protocol resulted in differentiation into a CD4 cytotoxic T cell-like lineage. Global gene expression and epigenetic analysis is aiding in defining the molecular events driving such differentiation. Further, transcription factors and lncRNAs involved in the generation of CD4 cytotoxic T cells are being elucidated; whether these cells express pathogen-specific features is also being determined.

Infectious Diseases

Learning how viral genes exploit cellular processes to promote viral replication has been a long-standing interest. The Tat protein from HIV subtype B was shown to exhibit significantly higher RNAi-silencing suppressor activity than the Tat protein from HIV subtype C. The E3 ligase CHIP was shown to modulate the stability of Tat, and transfection of CHIP significantly reduced HIV-1 replication. In other work, novel frame-shift mutations in the gene for CCR5 were detected in HIV sero-negative individuals from North India.

Molecules made by the *Plasmodium* parasite which work to manipulate host biochemical pathways in hepatocytes could prove to be good targets for the development of anti-malarial drugs. In this regard, the properties of T-cell immunomodulatory protein (Tip) were investigated. Tip was present in the blood of infected mice and reduced the pro-inflammatory effects of LPS, while enhancing secretion of IL-10 and TGF-β; these effects can potentially influence immune responses against the parasite.

Signaling events in apicomplexan parasites, as well as in mammalian neurons, have been enduring interests. Partial knockdown of PfVps15 (a kinase essential for blood stage development of *Plasmodium*) caused a decrease in parasite growth. Data suggests an important role of Vps15 in *Toxoplasma* development as well. Molecular mechanisms that regulate cell cycle-related neuronal apoptosis triggered by Aβ42, and regulated by various miRNAs, are being delineated.

Studies seek to discover how metabolic dysfunction drives pathology in microbial and autoimmune diseases. Diisonitrile lipopetides, absent in planktonic cultures, were identified in biofilm extracts from *M. tuberculosis* (*M.tb*); analysis of the functional properties of these metabolites is in progress. Sequential RNA-seq analysis over the 6-day pigmentation cycle of B16 melanoma cells revealed evidence of metabolic changes, coupled with changes in mitochondrial respiration; potential molecular links between mitochondrial metabolism and pigmentation are being discerned.

Signaling cascades which work to promote survival of *M.tb* are being delineated. Infection of macrophages with *H37Rv* resulted in higher levels of double-stranded breaks in host DNA than did infection with *H37Ra*; damage to host DNA was also observed in *M.tb*-infected mice. Treatment of infected mice with a combination of isoniazid and an ATM inhibitor resulted in a synergistic reduction in bacterial load; reversing pro-survival signals may therefore result in therapeutic benefit.

Mycobacterium indicus pranii (MIP) is being investigated for its utility, both as a potential therapeutic against cancer, and as a vaccine against

M.tb. Immunization with MIP reduced metastasis of B16F10 melanoma cells in mice, possibly due to decreased MMP9 and VEGF levels. Studies also suggest a direct effect of MIP on the progression of the tumor cell cycle. Lipoarabinomannan derived from MIP was shown to induce autophagy in *M.tb*-infected macrophages, enhancing bacterial clearance.

Flagship Programme of NII

NII has initiated a Flagship Programme in Immuno Engineering. This umbrella project encompasses research on novel adjuvants and vaccines (for infectious diseases and cancer), immunotherapy strategies and artificial antigen presenting cells, scaffolds and drug delivery devices, and on new methods and protocols for regenerative medicine. Several therapeutic modalities involve the adoptive transfer of cells that have been modified *in vitro* using molecular methods, and then grown to high density in bioreactors, in the presence of appropriate cytokines, growth factors and support cells. We therefore aim to also set up an advanced cell culture/fermentation facility to grow human cells/tissues/organs for therapeutic applications.

Acknowledgement

The support of the Department of Biotechnology, in terms of both funds and intellectual inputs, has been an enduring source of strength; the administrative assistance and guidance has allowed the optimal use of our resources.

We look forward to the annual meetings of RAP SAC with great eagerness. The feedback and critique we receive serve to shape the course of our work.

The last few months have been particularly trying, with the on-going pandemic. Members of our administrative staff have stepped up to the challenge, making sure that we are not lacking for supplies and reagents. Members of our technical staff too have responded in an exemplary fashion, keeping critical services going. Support services are helping us tide over the crisis with individuals going above and beyond the call of duty, unmindful of personal inconvenience; staff members at the Primate Research Centre and the Small Animal Facility deserve special mention in this regard.

We shall continue to build on our strengths, and look to the future with great anticipation.

Amulya K. Panda
Director

Date: 30th August 2020

RESEARCH REPORTS

A. IMMUNITY AND INFECTION

1. HIV-1 and Dengue pathogenesis

– Dr. Akhil C. Banerjea

My lab focuses on studying viral and host gene interaction as this knowledge can be ultimately used for effective intervention. HIV-1 Tat and HIV-1 using co-receptor – CCR5, was genetically analyzed from Indian population. Unique mutations that potentially alter their known functions were identified. Tat and Vif are very important proteins for HIV-1 pathogenesis and we report that it is degraded by an E3 ligase – CHIP. Exosomes and miRNAs play a major role in many viral diseases. We have identified novel exosomes and miRNAs that impact Dengue pathogenesis.

2. Study of immunotherapeutic potential of *Mycobacterium indicus pranii* (MIP) and the underlying mechanisms in animal models of tuberculosis and tumor

– Dr. Sangeeta Bhaskar

TB-IRIS is a major problem in the treatment of HIV and *M.tb* co-infection which is due to hyperactive immune response. Macrophages are the major host cells exploited by M.tb for its growth and are very much likely to play an important role in the activation of hyperactive $CD4^+$ T cell response. Studies done till now in the project have shown that macrophages of T cell deficient TCRβ−/− mice have higher activation status even without addition of CD4 T cells. The addition of CD4 T cells further stimulates the secretion of proinflammatory cytokines which raises the possibility that communication between CD4 T cells and macrophages could be a key factor driving the excessive inflammation during mycobacterial IRIS (Immune Reconstitution Inflammatory Syndrome). Transfer of CD4 T cells into TCRβ−/− mice resulted in fatal wasting disease. Study described a mice model for IRIS disease that recapitulates the fundamental immunological scenario of M.tb associated IRIS. Study shows that macrophages are differently activated in the absence of T cells which supports our hypothesis.

3. Studies on immune response from antigen loaded biodegradable polymer particles and protein refolding from inclusion bodies

– Dr. Amulya K. Panda

The major research effort of the laboratory is to develop nanoparticle-based Pneumococcal vaccine. The activities have been in three different areas such as (i) use of carbohydrates from different serotypes (1, 14, 6B and 5) of *S. pneumoniae* and immunological evaluation of its nanoformulations, (ii) conjugation of pneumococcal protein (SP0845) with polysaccharides and its immunological evaluation, and (iii) purification and characterization different immunodominat protein (PsaA, SP9845, ABC transporter protein and penumolysin) from *S. pneumoniae* and its evaluation as protein-based vaccine.

Sp0845 protein was purified to homogeneity and conjugated to PCP1 and 14 using CDAP conjugation method. The conjugates were purified and characterized. Briefly, pneumococcal polysaccharide was activated using organic cyanylating reagent 1-cyano-4-dimethylaminopyridinium tetrafluoroborate (CDAP). The prepared conjugate was purified using gel filtration chromatography and was further characterized using proton NMR. Protein and polysaccharide content of purified conjugate was estimated using BCA assay and anthrone assay respectively. Immunization studies with PCP1-SP0845 conjugate and nanoparticle entrapping the conjugate are in progress.

4. Inflammation during infection with *Salmonella* downregulates antibody response to non-*Salmonella* proteins antigens

– Dr. Ayub Qadri

Infection with pathogenic *Salmonella* generates inflammatory and innate immune responses which play a critical role in clearing this pathogen from the infected host. These

responses are accompanied by splenomegaly and changes in splenic cellularity and architecture. We asked if these changes might affect antibody response to non-*Salmonella* antigens. Mice were infected with *Salmonella* and on the day when changes in splenic cellularity were at peak, we immunized them with ovalbumin, tetanus toxoid or Vi capsular polysaccharide. The results showed that the inflammatory responses elicited with *Salmonella* significantly reduce the ability of mice to produce antibodies against protein antigens but not against Vi. This transient unresponsiveness was overcome once the inflammation was resolved. These results have implications for understanding immunity during co-infections.

5. **Disorders of proliferation: Analysis of novel pathways and targets**

– Dr. Rahul Pal

A. Lupus-associated immune responses

Human chorionic gonadotropin (hCG) and lupus

hCG (a pregnancy hormone), along with apoptotic blebs (which have been implicated in lupus onset), induced enhanced inflammatory responses and autoantibody secretion in splenocytes cultures from lupus-prone mice. These observations are significant, given the association of pregnancy with flares of lupus disease.

Hemoglobin (Hb) and lupus

PBMCs derived from SLE patients secreted higher levels of inflammatory cytokines in response to Hb. Infusion of ferric Hb into lupus-prone mice induced secretion of lupus-associated cytokines and autoantibodies, and accelerated glomerulosclerosis; Hb could therefore play a role in lupus pathogenesis.

B. hCG in tumorigenesis

Steroids decreased the viability of lung tumor (LLC1) cells. LLC1 tumors grew faster in ovariectomized hCG transgenic mice, and supplementation with progesterone reduced tumor volumes. The fact that incidence of some cancers in women increases post-menopause, coinciding with enhanced circulating levels of hCG, is relevant to these findings.

6. **Microbial interface biology and associated host immune response**

– Dr. Devinder Sehgal

Pneumococcal capsular polysaccharide (PCP) is the major virulence determinant of *Streptococcus pneumoniae* (pneumococcus). Strains devoid of the capsule are avirulent or highly attenuated. PCP is present in soluble form and on pneumococci in infected individuals. A study was undertaken to characterise the interaction of PCP from serotype 1 (PCP1) with immune cells, and its proinflammatory, immunomodulatory and antigenic properties. Binding of PCP1 to the surface of immune cells led to proinflammatory cytokine production which was not cell line or cytokine restricted. HEK293T transfectants expressing TLR1 and TLR2 produced IL-8 upon stimulation with PCP1,untransfected cells did not do so. PCP1 failed to induce TNF-α production from RAW264.7 cells when pre-incubated with a TLR2 blocking antibody. The surface binding of PCP1 was abrogated in the presence of TLR2 blocking antibody. PCP1 failed to bind TLR2 deficient RAW264.7 cells and induce TNF-α production. Unlike PCP1, alkali-treated PCP1 failed to stimulate RAW264.7 cells to produce TNF-α indicating the importance of alkali-sensitive moieties like *O*-acetyl groups. Alkali-treated PCP1 elicited lower anti-PCP1 antibody response. Mice experiments suggested that alkali-sensitive groups are significant targets of protective antibodies in PCP1 immunized mice. Our findings demonstrate that PCP1 is an important modulator of immune response against pneumococci.

7. ***Plasmodium* proteins involved in virulence and host modulation: Host-parasite interactions in *Plasmodium* liver stages**

– Dr. Agam Prasad Singh

Basic theme is to identify parasite molecules that affect the host processes.

1. We found that malaria immunomodulatory protein (TIP) binds to macrophages and dampens the proinflammatory immune response. TIP also upregulates the mediators of anti-inflammatory immune response. TIP protein was detected in the serum of infected animals.

2. Previously we reported that *Pb*HspJ2 is important for malaria gametocyte development. We further report that *Pb*HspJ2 interacts with ApiAP2 transcription factors found in malaria parasites. ApiAP2 is known to play a role in gametocyte development. In the *Pb*HspJ2 knockout parasite transcriptome a majority of the downregulated genes were related with gametocyte development. In the upstream sequences of these genes (50 in number) we found a conserved motif (TCT ACA) which is the binding motif for ApiAP2 transcription factor.

3. Artemisinin (antimalarial drug) is water insoluble. We have made a liposome nanoparticle-based formulation in aqueous buffer which is as active as artemisinin dissolved in ethanol.

8. **The NF-κB signaling system in human health and disease**

– Dr. Soumen Basak

The canonical NF-κB pathway coordinates inflammatory immune responses against microbial pathogens. In addition, microbial substances induce the activity of the anti-viral TBK1-IRF3 pathway. Tissue-morphogenetic cues instead engage the noncanonical NF-κB pathway, which mediates the expression of immune-differentiation factors. A variety of biochemical mechanisms link these immune signaling pathways within an integrated cellular network. We are interested in understanding if crosstalk between these pathways provides for immunoregulatory mechanisms in health and diseases. Our research has established the role of signal integration in tuning pro-inflammatory TNF responses and in modulating anti-viral immunity. We are currently examining if dendritic cell autonomous crosstalk between noncanonical NF-κB signaling and the canonical NF-κB, as well as the TBK1-IRF3 pathways, exacerbates intestinal inflammation. We hope that our analyses will inform novel therapeutic approaches targeting cross-regulatory signaling mechanisms.

9. **RelB dampens anti-viral responses by suppressing host type I interferon signaling**

– Dr. Prafullakumar B. Tailor

Interferons (IFN) are potent anti-viral agents that also regulate many cellular processes like immune responses, cell differentiation, maturation etc. Dendritic cells (DCs) are collection of heterogeneous population of antigen presenting cells that initiate innate immunity, activate co-stimulatory signals, produce high levels of effector cytokines and define an outcome of adaptive immune responses. DCs found from almost all body organs are classified into plasmacytoid DCs (pDCs), $CD8^+$cDC1 and $CD11b^+$ cDC2 subtype.

Type I Interferon (IFN) signaling plays a critical role in DC development and functions. Hyper type I IFN signaling is reported to block cDC2 subtype development. RelB, a member of NF-κB signaling pathway is essential to development of cDC2 subtype. We analyzed effect of RelB expression on type I IFN signaling in DCs. We showed that *RelB* suppresses type I IFN signaling in cDC2 cultures. TLR stimulation of FL-DCs led to RelB induction coinciding with fall in IFNs and Interferon stimulated genes (ISG) signatures. Towards understanding mechanism, we showed that effects of RelB are mediated by increased levels of IκBα. Further we demonstrated that defect in cDC2 development in RelB deficient mice can be

rescued in *Ifnar1* null background. Overall, we propose a novel role of RelB as a negative regulator of the type I IFN signaling pathway, fine tuning development of cDC2 subtype. Our study demonstrated that RelB dampened antiviral responses by lowering ISG levels.

10. **Biology of follicular T helper cells in protective immunity**

– Dr. Nimesh Gupta

Vaccines are the most cost effective and extremely successful preventive measures against emerging pathogens capable of causing pandemics. The ideal vaccine should confer long-lasting, broadly protective immunity in a single dose immunization. This could only be achieved if vaccines are developed with rational design. To rationalize vaccine design, it's necessary to understand the immunological determinants of long-term protective immunity. Nearly all vaccines confer protection through antibodies. Therefore, our laboratory is actively working on resolving the key immunological determinants of long-term sustained immunity. At present, we are studying controlled human vaccination with live attenuated SA14-14-2 Japanese encephalitis vaccine and human infection of Japanese encephalitis and dengue. The global aim of our program is to identify and harness the positive attributes of sustained immunity and Tfh cells for rational development of the efficient vaccines.

11. **T cell memory in infectious diseases in humans**

– Dr. Veena S Patil

The acquisition of immunological memory to infections is a hallmark of protective immunity and hence forms the basis for vaccinations. Our interest lies in understanding how the T cell immune memory is formed during the primary infection and maintained over the years to defend the subsequent secondary infection from the same pathogen. Each pathogen elicits a specialized T cell memory subset and once formed this specialized T cell memory can provide life-long immunity to the same pathogen. Our lab is focused on understanding such specialized protective T cell memory subsets; CD4+ cytotoxic memory T cells in viral infections (dengue virus, cytomegalovirus, EBV) and CD4+ TH1 and TH1/17 memory subsets in *Mycobacterium tuberculosis* infection. Broadly, our research goal is to understand the biology of such specialized memory subsets and utilize this knowledge in designing and developing strategies to boost durable immune responses following therapeutics and vaccination against these pathogens.

12. **Nanotechnology-based immuno-therapeutic platform for cancer**

– Dr. Santiswarup Singha

Cancer immunotherapy holds promises for precise treatment to block cancer growth and metastasis. Cancer cells dampen the anti-tumor immune response by a complex immune inhibitory signalling mechanism. To overcome these challenges, we are harvesting the potential of nanotechnology to design and deploy artificial antigen-presenting cells (αAPCs) to induce sustainable anti-tumor immune response, as material based αAPCs are nonresponsive to tumor mediated immune inhibitory signals. Additionally, we are designing the nanoparticle platform to empower the professional APCs to process and present the tumor-associated antigen to elicit the tumor-specific immune response. We are also investigating if nanotechnological intervention by targeting the chaperone network, a vital life-line of tumor cells, could make it more recognizable to the host immune system. Collectively, we are expecting our study will discover nanotechnology-based immunotherapeutic interventions to treat cancer growth and metastasis.

B. REPRODUCTION AND DEVELOPMENT

13. **Cell death regulation**

– Dr. Chandrima Shaha

The overall theme of the research program is to elucidate the processes that influence cell

death programs under varying physiological conditions in diverse model systems. *Leishmania* parasite causing the disease of kala-azar is a problem in India and in order to eliminate it, drugs are to be developed. One of the vulnerable proteins is Atg8 of the autophagy pathway. We show that this protein is essential for the infective abilities of the parasite and its survival. Therefore, antagonistic molecules would be suitable for drug development. Another study shows the efficacy of Halictine-2, an antimicrobial peptide as an effective anti-leishmanial agent that can be developed as a drug alone or in combination with another anti-leishmanial agent. We also show that defensive enzyme tryparedoxin peroxidase manipulates the death pathway of the host cell (macrophage) to the parasite, opening up another possible point of interception to deactivate the parasite.

14. **Biology of trophoblast cells and immuno-contraception**

– Dr. Satish K. Gupta

Studies were initiated to evaluate the immunogenicity and contraceptive efficacy of 3 vaccine formulations based on recombinant zona pellucida (ZP) proteins/gonadotropin releasing hormone (GnRH) in female beagle dogs. Initial studies suggest that one of the formulations compring *E. coli*-expressed recombinant dog ZP3 epitope and GnRH fusion protein showed promising contraceptive efficacy. To understand implantation biology, the role of miRNAs in trophoblast cells migration, invasion and differentiation was investigated. We showed that miR-33a-5p, miR-18a-3p & miR-320c regulate hepatocyte growth factor-mediated trophoblast cells migration. Direct inhibition of MAPK8 and FAS by miR-92a-1-5p during EGF-mediated HTR-8/SVneo cells invasion was proved through a luciferase reporter assay. Further, STAT1/3 regulates the expression of miR-92a-1-5 by binding to its promoter region. miR-27b-5p regulates trophoblast cells differentiation and secretion of progesterone and hCG by targeting HSD3β1 & WNT2B. These investigations will help in our understanding of basic biology of placental development as well as better management of pregnancy-associated complications such as preeclampsia/intra uterine growth restriction.

15. **Studies of Sertoli cells and spermatigonial stem cells of the testis and other endocrinology related research**

– Dr. Subeer S. Majumdar

Research in our lab involves understanding regulation of germ cell division and differentiation by Sertoli cells (a testicular cell type crucial for spermatogenesis) and the development of novel technologies for generating transgenic animals. Infertility is an emerging global problem and compromised Sertoli cell (Sc) function is one of the likely causes of idiopathic male infertility. We use high throughput genomic and proteomic tools to identify genes which may play an important role in Sc maturation and spermatogenesis. We have generated transgenic animals with Sc-specific knock-down of certain genes to decipher their novel role in sperm production. Currently, we are trying to identify the role of microRNAs in Sc maturation and spermatogenesis *in vivo,* using transgenic mouse models. Additionally, we make various transgenic animals for investigators of other institutes to facilitate their research.

C. MOLECULAR DESIGN

16. **Molecular mechanism of enzymatic reactions and enzyme-ligand interactions**

– Dr. Apurba Kumar Sau

Unlike in human gunanylate binding protein-1 (hGBP-1), the helical domain of its homolog hGBP-2 has no role in GMP formation. Thus, the decreased GMP formation in hGBP-2 as compared to hGBP-1 is primarily because of the difference in their GTP-binding domain. The data also suggest that a large sequence variation seen in the guanine cap may be

responsible for the lower GMP formation. Furthermore, we show that the interactions mainly between the helical and the GTP-binding domains of hGBP-2 are essential for tetramer formation. Our studies on *Helicobacter pylori* arginine decarboxylase have provided a structural insight into the binding of the inhibitor to the enzyme.

17. **Molecular modelling of proteins and protein-ligand complexes using knowledge-based approaches and all atom simulations**

– Dr. Debasisa Mohanty

Ribosomally synthesized and post-translationally modified peptides (RiPPs) constitute a large class of natural products with diverse structures and bioactivities. We have developed RiPPMiner-Genome, a significantly updated version of earlier developed software RiPPMiner, which can take genomic sequences as input and identify RiPP biosynthetic gene clusters (BGC) and modifying enzymes using HMM profiles. Using a machine learning approach, it can identify precursor peptide from among multiple small ORFs in the RiPP BGC and subsequently predict its cleavage site and cross-linked chemical structure. In RiPPs, like lanthipeptides, it can also identify other modified residues which are not cross-linked. This significantly enhances the accuracy of RiPP chemical structure prediction by RiPP-Genome compared to the predictions by RiPPMiner. We also have carried out a systematic benchmarking of the prediction accuracy of RiPPMiner-Genome for tasks like BGC identification, precursor prediction, prediction of leader cleavage and cross-link prediction.

18. **Delineating immune metabolism interaction in disease pathogenesis of tuberculosis and vitiligo**

– Dr. Rajesh Gokhale

Tuberculosis (TB) continues to be among the leading causes of infectious disease mortality in India. The primary causative organism, *Mycobacterium tuberculosis (Mtb)* during infection has to encounter a variety of host-imposed metabolic restrictions and molecular defenses. One of the key factors for survival is the competition between host and pathogen to mobilize transition metal pools for their advantage. We have identified novel diisonitrile lipopeptides from *Mtb* named 'kupyaphores' – ('Kupya' in Sanskrit refers to metals other than gold & silver and 'phores' means carrier). These molecules are induced very early during infection and primarily required for bacterial zinc homeostasis. A biosynthetic operon of 10.5 kbp produces kupyaphores that consist of a core dipeptide ornithine and phenylalaninol, N-acylated with long-chain isonitrile-fatty acyls. The kupyaphore *Mtb* mutant shows reduced pathology in animals, highlighting how early conditioning and fitness during bacterial infection can eventually determine patho-physiological outcomes.

19. **To develop strategies for making sensors and actuators for biological processes**

– Dr. Pramod K. Upadhyay

Immune dysregulation in retinitis pigmentosa (RP)

RP is a heritable ocular disease. The disease causes progressive photoreceptor degeneration due to genetic mutation.

The changes are initiated with the loss of photoreceptor depleting oxygen requirement hypoxia in the eye. In the rd1 mouse the molecules like COX2 and iNOS potentiate the chronic inflammation in the eye and anti-inflammatory cytokines like IL-10, TGF-β1 were downregulated. Upon breakdown of BRB there is an upregulation of MHC-II in the RPE layer. The cytokine profile and VEGF levels in RP patients indicated systemic hypoxia.

Utility of reprogrammed monocytes (RM) in sepsis

To generate a model of polymicrobial sepsis in mice, cecal ligation and puncture (CLP) surgery was performed in mice.

In the survival study, amongst all the treatment groups a maximum survival of 66.6% was observed at 24±2hrs in the group which received a combination of antibiotic and reprogrammed monocytes transplantation at an early stage of disease.

20. **Protease-catalyzed splicing of peptide bond**

– Dr. Rajendra P. Roy

We have been exploiting the peptide ligation propensity of transpeptidase sortase for semisynthesis of proteins and well-defined bioconjugates. We also study interrelationship between structure, function, and dynamics of sortase family enzymes. During the reporting year, we designed and engineered several cyclic sortase enzymes for enhanced stability. We created mutants of a class E sortase from *Thermofida fusca* with a view to delineate the principles governing the altered substrate specificity of this enzyme. Contemporaneously, we found the epigenetic eraser of acetyl mark at Lys-5 in histone H2B.

21. **Chemical glycobiology: Glycoform modulation, carbohydrate-based drug design, and glycomics**

– Dr. Srinivasa-Gopalan Sampathkumar

Glycoconjugates, composed of carbohydrates covalently attached to proteins and lipids, are abundantly present on the surface of mammalian cells. Glycosylation of proteins govern their interaction with the external environment, clustering of receptors, and participate in cell-cell, cell-extracellular matrix, and cell-pathogen interactions. Glycans are biosynthesized through a non-codon-templated process. Glycosylation of proteins in the endoplasmic reticulum and Golgi bodies results in a complex and diverse set of glycoforms. The structural diversity and functions of glycoproteins, particularly CD antigens, have been intractable until recently. We employ state-of-the-art mass spectrometry and glycoproteomics methodologies to comprehensively map the site occupancy of *O*-glycans on CD43 (leukosialin / sialophorin). Additionally, we employ analogues of hexosamines, as a tool, to inhibit *O*-glycosylation and study its role in modulation of the immune synapse. The ability to alter *O*-glycosylation on CD antigens in immune cells would help us understand the functions of cell surface glycans and their role in immunological disorders.

22. **Structural studies on proteins, dynamics and ligand interactions using NMR**

– Dr. Monica Sundd

Biotin is an important cofactor required for the proper functioning of several metabolic enzymes, *viz*. acetyl-CoA carboxylase, methylcrotonyl-CoA carboxylase, propionyl-CoA carboxylase, etc. In the absence of Biotin protein ligase that attaches to biotin, these mitochondrial carboxylases are inactive. We have determined the structure of *Leishmania* biotin protein ligase. It comprises an N-terminal catalytic domain, and a C-terminal domain with a long loop, that forms a unique domain swapped dimer. In the dimeric state, the C-terminal domain occupies the site where the BCCP domain binds, suggesting that it is probably a closed state. The crystal structure was used to identify potential inhibitors (NCI small molecule libraries) that target this enzyme, using AutoDock, and enzyme assay. The shortlisted candidates were next tested for their ability to inhibit the growth of *Leishmania donovani* (Ld1S) amastigote culture. Two potential inhibitors were identified that inhibit all three stages of *Leishmania donovani*.

23. **Therapeutic interventions in chronic diseases**

– Dr. Sarika Gupta

Bisphenol A (BPA) is a ubiquitously distributed endocrine disrupting chemical. BPA exposure in humans has been a matter of concern due to its increased application in the products of day-to-day use. BPA has been reported to cause toxicity in almost all vital organ systems even at very low dose levels. It crosses the blood brain

barrier and causes neurotoxicity. Our study focuses on the exposure effects of BPA on axonal and myelin structural proteins and neuroinflammatory marker proteins in adult C57BL/6J male mice in order to decipher the role of BPA in demyelinating disorders. We studied the effect of BPA on the cerebral cortex of C57BL/6J mice and examined whether BPA exposure alters the expression of axonal and myelin structural proteins. The oral dose of 40 µg and 400 µg BPA/kg for 60 days resulted in memory loss, muscle coordination deficits and allodynia. BPA exposure also caused degeneration of immature and mature oligodendrocytes. It was observed that subchronic BPA exposure caused neuroinflammation through deregulation of inflammatory cytokines mRNA and protein expression which further resulted into neurotoxicity through axonal as well as myelin degeneration in the brain. BPA also caused increased oxidative stress in the brain. Our study indicates long-term subchronic low dose exposure to BPA has the potential to cause axonal degeneration and demyelination in the oligodendrocytes and neurons which may have implications in neurological and neuropsychological disorders including multiple sclerosis (MS), neuromyelitis optica and others.

24. **Studies of *Mycobacterium tuberculosis* amino acids biosynthesis pathways**

– Dr. Bichitra Kumar Biswal

Tuberculosis (TB), caused by the bacillus *M. tuberculosis*, remains as a major health problem worldwide. Deriving a mechanistic understanding of enzymes involved in the essential amino acids pathways is likely to aid in the design of new anti-TB therapeutics. Over the years, we have been pursuing structural, biochemical and inhibition studies particularly on *M. tuberculosis* histidine biosynthesis pathway enzymes. We have determined the crystal structures of HisB (imidazole-glycerol-phosphate dehydratase), HisC (an amino-transferase), HisD (L-histidinol dehydrogenase), HisN (L-histidinol phosphate phosphatase) and HisC2 (an aminotransferase) and characterized their biochemical properties. Importantly, employing a structure-guided approach, we have designed a number of potent small molecule inhibitors against HisB, HisD and HisN. These inhibitors exhibit good anti-TB activity *in vitro*. Further experiments to examine the potency of these molecules *in vivo* models are being carried out.

25. **Biophysical and biochemical characterization of *Leishmania mexicana* phosphoglycerate kinase: an enzyme in the glycolytic pathway of parasitic protozoa**

– Dr. Vidya Raghunathan

Our laboratory focus is on elucidaing the structural and enzymological aspects of glycosomal enzymes in the parasitic protozoa, *Leishmania*. *Leishmania spp.* is a pathogen extremely dangerous for humans, that is either fatal or severely compromises the quality of life. As with many diseases currently, Leishmaniasis faces toxicity and non-responsiveness to treatments.

Proteins like phosphoglycerate kinase are critical housekeeping metabolic enzymes and traditionally been a 'touch me not' for potential targets in drug research. However the pressures of survival and evolutionary changes occur at many levels of protein secondary and tertiary structure that allow it to maintain its biological activity while also rendering new roles. It is these changing roles that give a new insight on how to design inhibitory drugs. Protein folding is an old problem with new intrigues: in it lies the entire coded history of a protein's evolution. These are the focus points of our study using PGK and its isoforms.

D. GENE REGULATION

26. **Cellular and molecular biology of human cancer**

– Dr. Anil Suri

Breast cancer is the most common and second leading cause of cancer deaths in developing

countries. Based on hormone receptors status, around 15% breast cancers are designated as triple-negative breast cancer (TNBC) for which limited treatment modalities are available. We demonstrated the involvement of AKAP4 in the growth of TNBC. Employing gene silencing approach reduction in cellular growth and migratory abilities of AKAP4 ablated TNBC cells was observed. Synergistic effect of Paclitaxel drug treatment enhanced TNBC cell death in AKAP4 ablated TNBC cells. AKAP4 ablation also resulted in reduced tumor growth in animal model**s**. Our data suggests therapeutic potential of AKAP4 in breast cancer.

Human clinical trials in cervical cancer patients stage IIIb

A Phase II, double blind, randomized, three arm study to evaluate the efficacy of a dendritic cell vaccine in stage IIIB cervical cancer employing therapeutic grade recombinant SPAG9 is underway in joint collaboration with Cancer Institute (WIA), Chennai. Till date, 48 patients have been re-evaluated by PET-CT scan. The number of patients in CR are 43/48. Five patients who have received 6-10 doses among the randomized arms will complete this year the vaccination regime. No vaccine-related toxicity has been observed except for pain at the site of intradermal injection. All the patients will be followed up for 30 months.

Human clinical trials in ovarian cancer patients stage IV

A Phase II clinical trial with a dendritic cell vaccine for the treatment of patients of recurrent /metastatic ovarian cancer who have failed two line of treatment, employing therapeutic grade recombinant SPAG9, is underway in joint collaboration with Cancer Institute (WIA), Chennai. Seventy five patients will be enrolled in the trial. The DCGI approval for was granted on 4th March 2020.

27. ***Mycobacterium tuberculosis (Mtb)*** **exploits host ATM kinase for survival advantage through SecA2 secretome**

– Dr. Vinay K. Nandicoori

Mtb produces inflections in the host signaling networks to create a favorable milieu for survival. The virulent *Mtb* strain, *Rv* caused double strand breaks (DSBs) whereas the non-virulent *Ra* strain triggered single stranded DNA generation. The effectors secreted by SecA2 pathway were essential and adequate for the genesis of DSBs. Accumulation of DSBs mediated through *Rv* activates ATM-Chk2 pathway of DNA damage response (DDR) signaling, resulting in altered cell cycle. Instead of the classical ATM-Chk2 DDR, *Mtb* gains survival advantage through ATM-Akt signaling cascade. Notably, *in vivo* infection with *Mtb* led to sustained DSBs and ATM activation during the chronic phase of tuberculosis. Addition of ATM inhibitor enhances isoniazid mediated *Mtb* clearance in macrophages as well as in murine infection model, suggesting its utility for host directed adjunct therapy. Collectively, data suggests that DSBs inflicted by SecA2 secretome of *Mtb* provides survival niche through activation of ATM kinase.

28. **Determining the signaling and repair pathways that are altered in human cancer**

– Dr. Sagar Sengupta

The gene encoding the tumor suppressor p53 is mutated in most cancers, and p53 expression is known to be tightly controlled by several E3 ligases. We have demonstrated that the E3 ligase, FBW7α, targets both wildtype and tumor derived mutants of p53 for proteasomal degradation in multiple human cancer cell lines. We found that lack of FBW7α stabilizes p53 levels, thereby increasing its half-life. The polyubiquitylation of p53 occurred via Lys-48 linkage and involved phosphorylation on p53 at Ser-33 and Ser-37 by GSK3β and DNA-PK, respectively. These phosphorylation events created a phosphodegron that enhanced p53 binding to FBW7α, allowing for the attachment of polyubiquitin moieties at Lys-132 in p53. FBW7α-dependent p53 polyubiquitylation apparently occurred during and immediately after DNA double-strand breaks induced by either doxorubicin or ionizing radiation. Phosphodegron-mediated polyubiquitylation of p53 on Lys-132 had functional consequences,

with cells in which FBW7α-mediated p53 degradation was abrogated exhibiting enhancement of their tumorigenic potential.

29. **Epigenetic regulation of the eukaryotic genome: Role of CTCF in organizing chromatin**

– Dr. Madhulika Srivastava

Specific interactions of myriad *cis*-acting elements and *trans*-acting factors are required within the eukaryotic nuclear milieu to accomplish regulation of nuclear processes critical for development and cellular functions. Antigen receptor loci like Igh, TCRa/d, TCRb etc., exhibit exquisitely precise regulation of transcription as well as RAG mediated VDJ recombination during development. This requires appropriate enhancer-promoter interactions and resultant epigenetic alterations at the nucleosomal level. In this context, since CTCF is an important global factor contributing to long range interactions of chromatin that are vital for enhancer-promoter interactions as well as other *cis*-DNA interactions, we have investigated the influence of mutation of specific CTCF binding sites at the TCRb locus in mice. Significant changes in the usage of V segments for VDJ recombination were observed.

30. **Role of cell signaling in eukaryotic development**

– Dr. Pushkar Sharma

We are interested in exploring cell signaling events in the biology of two diverse cell types: 1) human parasitic pathogens *Plasmodium falciparum and Toxoplasma gondii* and 2) mammalian neurons. Following is the summary of our recent findings in these areas: 1. We found out that a kinase Vps15 regulates the development of Apicomplexan parasites *Plasmodium falciparum* and *Toxoplasma gondii*. Furthermore, we also unraveled the role of phosphorylation of a protein called RhopH3 in invasion of host RBCs by *P. falciparum*; 2. The mechanisms involved in the regulation of ubiquitin ligase Itch in neurodegeneration were dissected. In addition, the role of microRNAs in neuronal cell death was also investigated.

31. **Understanding the regulation of DNA replication**

– Dr. Sandeep Saxena

Our laboratory is working towards understanding the mechanisms by which non-coding RNAs and checkpoint proteins prevent genomic instability and cancer. We have identified lncRNAs as vital cellular targets. Next, based on our results we concluded that on sensing oxidative stress, the cell induces miRNAs from a megacluster to mediate cell cycle arrest. Finally, we have demonstrated that deficiency of a protein called Sld5 triggers a sequence of events that destabilize the entire dynein protein complex. These studies have led to a greater understanding on how cellular protective mechanisms prevent genomic instability and cancer.

32. **The role of tumor suppressors in stress response**

– Dr. Sanjeev Das

The focus of the lab is to understand the function and regulation of tumor suppressors. Here, we report the work carried out on two proteins viz. caspase-10 and HDAC5. Caspase-10 belongs to the cysteine-aspartate protease family of initiator caspases. Our proteomics screen identified metabolic enzyme ACLY as a caspase-10 interacting protein. Our data suggests that downregulation of caspase-10 expression and consequent upregulation of ACLY is critical for lung cancer progression. Dysregulation of HDAC5 has been implicated in development of various cancers. Here we report that SATB1 is a novel HDAC5 interactor. Further studies will be performed to delineate the role of HDAC5-SATB1 axis in neoplastic transformation.

33. **Elucidating the molecular mechanisms of aging and innate immunity using *Caenorhabditis elegans* as a model system**

– Dr. Arnab Mukhopadhyay

In my lab, we use *Caenorhabditis elegans* and mice as model systems to understand the molecular basis of somatic as well as

reproductive aging and nutritional interventions that can delay it. Our laboratory combines genetics, molecular biology and genomics to decipher signalling events that regulate gene expression during aging and reproduction that is affected by nutrients. We study the complex interplay of transcription factors and co-regulators downstream of the conserved insulin signalling pathway that regulate gene expression as a part of a nutrient sensing network. Since Dietary Restriction (DR) increases life span and delays age-onset diseases, we are trying to decipher the molecular events that follow initiation of DR, including cellular signalling events and transcription as well as post-transcriptional responses. Using chemical genetics in *C. elegans* followed by mice experiments, we are trying to reposition FDA approved drugs to treat diabetes and increase life span.

34. **Role of non-coding RNA mediated gene regulation in human development and disease**

– Dr. Arimbasseri AG

Protein synthesis has been known to be deregulated in a wide range of diseases including cancer and infectious diseases. *Mycobacterium tuberculosis* is a human pathogen that claims more lives than any other infectious agent. The emergence of multidrug-resistant *Mtb* is a major concern, especially for India, which has the highest *Mtb* burden. A number of antibiotics that are used to treat tuberculosis as well as other bacterial infections target ribosomes, the protein synthesis factory in the cell. But ribosomal dynamics in *Mtb* is not yet understood.

We developed a new version of the cutting-edge technology, ribosome profiling, that enables us to analyze the ribosome dynamics in *Mtb* at a high resolution. We found that the ribosome dynamics of *Mtb* as evidenced by the widespread ribosome pausing is dramatically different from that of well-studied model organisms such as *E. coli*.

35. **Understanding the sources and mediators of meta-inflammation that aggravate inflammatory bowel disease (IBD) pathogenesis during Obesity/ Lean Metabolic Obesity (LMO)**

– Dr. Devram Sampat Ghorpade

Ulcers of the digestive system as a result of the excessive meta-inflammatory responses constitute a major health risk as well as an economic burden. It is observed that consumption of low fiber, fatty-enrich food items (pizza, burger, french-fries, high-sugar-drinks, etc.) increases the chances of digestive tract ulcers. However, the underlying molecular mechanism is not well understood. In our laboratory, we use diet-induced obese mouse models as well as lean mouse models which are insulin resistant to recapitulate the heterogenous population found in the Indian subcontinent. Using these Indian population-relevant mouse models and tissue culture-based techniques we design and carry out experiments to understand the key unanswered questions related to fatty diet and human health. Our study would allow us to specifically target the crucial molecules/ mechanisms for the development of better therapeutics for obesity/diabetes-associated gut ulcers.

PUBLICATIONS

Annexure-I

ORIGINAL PEER-REVIEWED ARTICLES

1. Ahad A, Stevanin M, Smita S, Mishra GP, Gupta D, Waszak SM, Sarkar UA, Basak S, Gupta B, Acha-Orbea H, Raghav SK (2019) NCoR1: putting the brakes on the dendritic cell immune tolerance. **iScience** 19: 996-1011.

2. Amjad A, Farooqui SR, Banerjea AC (2019) The host cell ubiquitin ligase protein CHIP is a potent suppressor of HIV-1 replication. **J Biol Chem.** 294: 7283–7295.

3. Bais SS, Ratra Y, Khan NA, Pandey R, Kushawaha PK, Tomar S, Medigeshi G, Singh A, Basak S (2019) Chandipura virus utilizes the pro-survival function of RelA NF-κB for its propagation. **J Virol.** doi: 10.1128/JVI.00081-19.

4. Berger JM, Singh P, Khrimian L, Morgan DA, Chowdhury S, Arteaga-Solis E, Horvath TL, Domingos AI, Marsland AL, Yadav VK, Rahmouni K, Gao XB, Karsenty G (2019) Mediation of the Acute Stress Response by the Skeleton. **Cell Metab.** 30: 890-902.

5. Bhalla P, Shukla A, Vernekar DV, Arimbasseri AG, Sandhu KS, Bhargava P (2019) Yeast PAF1 complex counters the pol III accumulation and replication stress on the tRNA genes. **Sci Rep.** doi: 10.1038/s41598-019-49316-5.

6. Bhasym A, Gurjar BS, Prabhu S, Puraswani M, Khandelwal P, Saini H, Saini S, Chatterjee P, Bal V, George A, Coshic P, Patidar G, Hari P, Sinha A, Bagga A, Rath S, Guchhait P (2019) Altered peripheral blood leucocyte phenotype and responses in healthy individuals with homozygous deletion of FHR1 and FHR3 genes. **J Clin Immunol.** 39: 336-345.

7. Bhattacharya I, Sen Sharma S, Majumdar SS (2019) Pubertal Orchestration of hormones and testis in primates. **Mol Reprod Dev.** 86: 1505-1530.

8. Chatterjee B, Roy P, Sarkar UA, Zhao M, Ratra Y, Singh A, Chawla M, De S, Gomes J, Sen S, Basak S (2019) Immune differentiation regulator p100 tunes NF-κB responses to TNF. **Front Immunol**. doi: 10.3389/fimmu.2019.00997.

9. Chawla AS, Khalsa JK, Dhar A, Gupta S, Umar D, Arimbasseri GA, Bal V, George A, Rath S. (2020) A role for cell-autocrine interleukin-2 in regulatory T cell homeostasis. **Immunology.** doi: 10.1111/imm.13194.

10. Dhar A, Chawla M, Chattopadhyay S, Oswal N, Umar D, Gupta S, Bal V, Rath S, George A, Arimbasseri GA, Basak S (2019) Role of NF-kappaB2-p100 in regulatory T cell homeostasis and activation. **Sci Rep**. doi: 10.1038/s41598-019-50454-z.

11. Dhawan S, Ghosh S, Ravinder R, Bais SS, Basak S, Krishnan ANM, Agarwal M, Banerjee M and Haridas V (2019) Redox sensitive self-assembling dipeptide for sustained intracellular drug delivery. **Bioconjug Chem.** 30: 2458-2468.

12. Di Somma A, Caterino M, Soni V, Agarwal M, Pasquale PD, Zanetti S, Molicotti P, Cannas S, Nandicoori VK, Duilio A (2019) The bifunctional protein GlmU is a key factor in biofilm formation induced by alkylating stress in *Mycobacterium smegmatis*. **Res Microbiol.** 170: 171-181.

13. Dutta A, Mazumder M, Alam M, Gourinath S, Sau AK (2019) Metal-induced change in catalytic loop positioning in *H.pylori* arginase alters catalytic function. **Biochemical J.** 476: 3595-3614.

14. Dwivedi R, Aggarwal P, Bhavesh NS, Kaur KJ. (2019) Design of therapeutically improved analogue of the antimicrobial peptide, indolicidin, using a glycosylation strategy. **Amino Acids** 51: 1443-1460.

15. Fatima S, Panda AK, Talegaonkar S, Iqbal Z, Ahmad FJ (2019) Optimization and designing of amikacin-loaded poly D, L-lactide-co-glycolide nanoparticles for effective and sustained drug delivery. **J Pharm Bioallied Sci**. 11: 83-95.

16. Garg S, Shivappagowdar A, Hada RS, Ayana R, Bathula C, Sen S, Kalia I, Pati S, Singh AP, Singh S (2020) Supression of Perforin-like Protein pores inhibit Plasmodium multistage-growth, transmission and erythrocyte senescence. **Front Cell Infect Microbiol.** doi: 10.3389/fcimb.2020.00121.

17. Giri S and Shaha C (2019) *Leishmania* donovani parasite requires Atg8 protein for infectivity and survival under stress. **Cell Death Dis.** doi: 10.1038/s41419-019-2038-7.

18. Grover R, Burse SA, Shankrit S, Aggarwal A, Kirty K, Narta K, Srivastav R, Ray AK, Malik G, Vats A, Motiani RK, Thukral L, Roy SS, Bhattacharya S, Sharma R, Natarajan K, Mukerji M, Pandey R, Gokhale RS, Natarajan VT (2019) Myg1 exonuclease couples the nuclear and mitochondrial translational programs through RNA processing. **Nucleic Acids Res.** 47: 5852-5866.

19. Gupta A, Chauhan A, Priya A, Mantri B, Wadhokar M, Dalave K, Shah B, Gokhale RS, Batra VV, Singh A (2020) Lesional skin in vitiligo exhibits delayed *in vivo* reepithelialization compared to the nonlesional skin. **Wound Repair Regen.** doi: 10.1111/wrr.12798.

20. Gupta A, Saqib M, Singh B, Pal L, Nishikanta A, Bhaskar S (2019) *Mycobacterium indicus pranii* induced memory T-Cells in lung airways are sentinels for improved protection against *Mtb* infection. **Front Immunol.** doi: 10.3389/fimmu.2019.02359.

21. Gupta S, Basu S, Bal V, Rath S, George A (2019) Gut IgA abundance in adult life is a major determinant of resistance to DSS-colitis and can compensate for the effects of inadequate maternal IgA received by neonates. **Immunology.** 158: 19-34.

22. Hakiem OR, Parijat P, Tripathi P, Batra JK (2019) Mechanism of HrcA function in heat shock regulation in *Mycobacterium tuberculosis*. **Biochimie.** 168: 285-296.

23. Jagadish N, Devi S, Gupta N, Suri V, Suri A (2020) Knock down of A-Kinase anchor protein (AKAP4) inhibits proliferation of triple negative breast cancer (TNBC) cells in vitro and in vivo. **Tumour Biol.** doi: 10.1177/1010428320914477.

24. Jatana N, Ascher DB, Pires DEV, Gokhale RS, Thukral L (2019) Human LC3 and GABARAP subfamily members achieve functional specificity via specific structural modulations. **Autophagy** 14: 1-17.

25. Jha B, Vyas R, Bhushan J, Sehgal D, Biswal BK (2019) Structural insights into substrate specificity of SP_0149, the substrate binding protein of a methionine ABC transporter from *Streptococcus pneumoniae* **Acta Cryst.** doi: 10.1107/S2053230X19009038.

26. Kanodia P, Kaur G, Coshic P, Chatterjee K, Neeman T, George A, Rath S, Bal V, Prabhu SB (2019) Characterization of biological variation of peripheral blood immune cytome in an Indian cohort. **Sci Rep**. doi: 10.1038/s41598-019-51294-7.

27. Kar M, Khan NA, Panwar A, Bais SS, Basak S, Goel R, Sopory S, and Medigeshi GR. (2019) Zinc chelation specifically inhibits early stages of dengue virus replication by activation of NF-κB and induction of antiviral response in epithelial cell. **Front Immunol.** doi: 10.3389/fimmu.2019.02347.

28. Karan S, Mohapatra A, Sahoo PK, Garg LC, Dixit A (2019) Structural-functional characterization of recombinant Apolipoprotein A-I from Labeo rohita demonstrates heat-resistant antimicrobial activity. **Appl Microbiol Biotechnol**. 104: 145-159.

29. Kaushal N, Kumari S, Jhelum H and Sehgal D (2020) *In vitro* and *in vivo* characterization of the interaction, proinflammatory, immunomodulatory and antigenic properties of capsular polysaccharide from *Streptococcus pneumoniae* serotype 1. **Int J Biol Macromol.** 143: 521-532.

30. Kaushik H, Deshmukh SK, Solanki AK, Bhatia B, Tiwari A, Garg LC (2019) Immunization with recombinant fusion of LTB and linear epitope (40-62) of epsilon toxin elicits protective immune response against the epsilon toxin of *Clostridium perfringens* type D. **AMB Express.** doi: 10.1186/s13568-019-0824-3.

31. Khalsa JK, Chawla AS, Prabhu SB, Vats M, Dhar A, Dev G, Das N, Mukherjee S, Tanwar S, Banerjee H, Durdik JM, Bal V, George A, Rath S, Arimbasseri GA (2019) Functionally significant metabolic differences between B and T lymphocyte lineages. **Immunology** 158: 104-120.

32. Khan J, Salhotra S, Goswami P, Akhter J, Jahan S, Gupta S, Sharma S, Banerjee BD, Parvez S, Gupta S, Raisuddin S (2019) Bisphenol A triggers axonal injury and myelin degeneration with concomitant neurobehavioral toxicity in C57BL/6J male mice. **Toxicology.** doi: 10.1016/j.tox.2019.152299.

33. Kumar B, Singla D, Kashif M, Sharma R, Dixit R, Singh AP, Saxena AK, Abid M, Pandey KC (2019) Metacaspase-3 of Plasmodium falciparum: An atypical trypsin-like serine protease. **Int J Biol Macromol.** 138: 309-320.

34. Kumar P, Das G, Bhaskar S (2019) *Mycobacterium indicus pranii* therapy induces tumor regression in MyD88 and TLR2 dependent manner. **BMC Res Notes** doi: 10.1186/s13104-019-4679-0.

35. Kumar R, Jha D and Panda AK (2019) Antimicrobial therapeutic system based on biodegradable polylactide/polylactide-co-glycolide particles. **Environ Chem Lett.** 17: 1237-1249.

36. Kumar R, Singh M, Meena J, Singhvi P, Thiyagarajan D, Saneja A, Panda AK (2019). Hyaluronic acid - dihydroartemisinin conjugate: Synthesis, characterization and in vitro evaluation in lung cancer cells. **Int J Biol Macromol.** 133: 495-502.

37. Kumar S, Dhembla C, P H, Sundd M, Patel AK (2020) Differential expression of structural and functional proteins during bean common mosaic virus-host plant interaction. **Microb Pathog.** doi: 10.1016/j.micpath.2019.103812.

38. Kumari R, Deshmukh RS and Das S (2019) Caspase-10 inhibits ATP-citrate lyase-mediated metabolic and epigenetic reprogramming to suppress tumorigenesis. **Nat Commun.** doi: 10.1038/s41467-019-12194-6.

39. Lochab S, Singh Y, Sengupta S, Nandicoori VK (2020) *Mycobacterium tuberculosis* exploits host ATM kinase for survival advantage through SecA2 secretome. **eLife** doi: 10.7554/eLife.51466.

40. Matai L, Sarkar GC, Chamoli M, Malik Y, Kumar SS, Rautela U, Jana NR, Chakraborty K, Mukhopadhyay A (2019) Dietary restriction improves proteostasis and increases life span through endoplasmic reticulum hormesis. **Proc Natl Acad Sci USA.** 116: 17383-17392.

41. Minhas V, Kumar R, Moitra T, Singh R, Panda AK, Gupta SK (2019) Immunogenicity and contraceptive efficacy of recombinant fusion protein encompassing Sp17 spermatozoa specific protein and GnRH: relevance of adjuvants and micro-particles based delivery to minimize number of injections. **Am J Reprod Immunol.** doi: 10.1111/aji.13218.

42. Mishra NN, Agarwal A, Polachira SK, Nair R, Gupta SK (2019) Anti-HIV-1 activity and safety profile of polyherbal gel formulation as candidate microbicide. **J Herbal Med.** doi: 10.1016/j.hermed.2019.100284.

43. Nagpal PS, Kesarwani A, Sahu P, Upadhyay P (2019) Aerosol immunization by alginate coated mycobacterium (BCG/MIP) particles provide enhanced immune response and protective efficacy than aerosol of plain mycobacterium against *Mtb*. H37Rv infection in mice. **BMC Infect Dis.** doi: 10.1186/s12879-019-4157-2.

44. Naiyer A, Islam A, Hassan MI, Ahmad F, Sundd M (2019) Backbone and side chain 1H, 15N and 13C chemical shift assignments of the molten globule state of L94G mutant of horse cytochrome-c. **Biomol NMR Assign.** doi: 10.1007/s12104-019-09917-7.

45. Pal M, Khan J, Kumar R, Surolia A, Gupta S (2019) Testosterone supplementation improves insulin responsiveness in HFD fed male T2DM mice and potentiates insulin signaling in the skeletal muscle and C2C12 myocyte cell line. **PLOS One.** doi:10.1371/journal.pone.0224162.

46. Pal S, Medatwal N, Kumar S, Kar A, Komalla V, Yavvari P, Mishra D, Rizvi Z, Nandan S, Malakar D, Pillai M, Awasthi A, Das P, Sharma R, Srivastava A, Sengupta S, Dasgupta U, Bajaj A (2019) A localized chimeric hydrogel therapy combats tumor progression through alteration of sphingolipid metabolism. **ACS Cent Sci.** 5: 1648-1662.

47. Parween F, Yadav J, Qadri A (2019) The virulence polysaccharide of Salmonella Typhi suppresses activation of Rho family GTPases to limit inflammatory responses from epithelial cells. **Front Cell Infect Microbiol.** doi: 10.3389/fcimb.2019.00141.

48. Pradhan BS, Bhattacharya I, Sarkar R, Majumdar SS (2019) Downregulation of Sostdc1 in testicular Sertoli cells is prerequisite for onset of robust spermatogenesis at puberty. **Sci Rep.** doi: 10.1038/s41598-019-47930-x.

49. Pradhan P, Srivastava A, Singh J, Biswas B, Saini A, Siddique I, Kumari P, Khan MA, Mishra A, Yadav PK, Kumar S, Bhavesh NS, Venkatraman P, Vivekanandan P, Kundu B (2020) Prion protein transcription is auto-regulated through dynamic interactions with G-quadruplex motifs in its own promoter. **Biochim Biophys Acta Gene Regul Mech.** doi: 10.1016/j.bbagrm.2019.194479.

50. Prasad D, Arora D, Nandicoori VK, Muniyappa K (2019) Elucidating the functional role of Mycobacterium smegmatis recX in stress response. **Sci. Rep.** doi: 10.1038/s41598-019-47312.

51. Quadiri A, Kalia I, Kashif M**,** Singh AP (2020) Identification and characterization of protective CD8+ T epitopes in a malaria vaccine candidate SLTRiP. **Immun Inflamm Dis.** doi: 10.1002/iid3.283.

52. Raja DA, Gotherwal V, Burse SA, Subramaniam YJ, Sultan F, Vats A, Gautam H, Sharma B, Sharma S, Singh A, Sivasubbu S, Gokhale RS, Natarajan VT (2020) pH-controlled histone acetylation amplifies melanocyte differentiation downstream of MITF. **EMBO Rep.** doi: 10.15252/embr.201948333.

53. Rajan S, Pandita E, Mittal M, Sau AK (2019) Understanding the lower GMP formation in large GTPase hGBP-2 and role of its individual domains in regulation of GTP hydrolysis. **FEBS J.** 286: 4103-4121.

54. Rajan S, Sau AK (2020) The alpha helix of the intermediate region in hGBP-1 acts as a coupler for enhanced GMP formation. **Biochim Biophys Acta Proteins Proteom.** doi:10.1016/j.bbapap.2020.140364.

55. Ranjan V, Mishra A, Kesarwani A, Mohan KV, Lal SN, Puliyel J, Upadhyay P (2020) Mother-to-child transfer of reactivated varicella-zoster virus DNA and varicella-zoster IgG in pregnancy. **Viral Immunol.** 33: 72-76.

56. Ronsard L, Sood V, Yousif AS, Ramesh J, Shanker V, Das J, Sumi N, Rai T, Mohankumar K, Sridharan S, Dorschel A, Ramchandran VG, Banerjea AC (2019) Genetic polymorphisms in the ORF of the CCR5 gene from HIV-1 seronegative and seropositive individuals from National Capital Regions of India. **Sci. Rep.** doi: 10.1038/s41598-019-44136-z.

57. Ronsard L, Yousif AS, Ramesh J, Sumi N, Gorman M, Ramachandran VG, Banerjea AC (2019) *In vitro* subtype-specific modulation of Tat on RNA-silencing-suppressor activity and cell death. **Viruses** doi: 10.3390/v11110976.

58. Saha I, Jaiswal H, Mishra R, Nel HJ, Schreuder J, Kaushik M, Singh Chauhan K, Singh Rawat B, Thomas R, Naik S, Kumar H, Tailor P (2020) RelB suppresses type I interferon signaling in dendritic cells. **Cell Immunol.** doi: 10.1016/j.cellimm.2020.104043.

59. Sahay P, Jain K, Sinha P, Das B, Mishra A, Kesarwani A, Sahu P, Mohan K V, Kumar MJM, Nagarajan P, Upadhyay P (2019) Generation of a rat model of acute liver failure by combining 70% partial hepatectomy and acetaminophen. **J Vis Exp.** doi: 10.3791/60146

60. Sevalkar R, Arora D, Singh P, Singh R, Nandicoori VK, Karthikeyan S, Sarkar D (2019) Functioning of mycobacterial heat-shock repressors requires the master virulence regulator PhoP. **J Bacteriol.** doi: 10.1128/JB.00013-19.

61. Shivappagowdar A, Pati S, Narayana C, Ayana R, Kaushik H, Sah R, Garg S, Khanna A, Kumari J, Garg L, Sagar R, Singh S (2019) A small bioactive glycoside inhibits epsilon toxin and protects host cell death. **Dis Model Mech**. doi: 10.1242/dmm.040410.

62. Singh B, Saqib M, Chakraborty A, Bhaskar S (2019) Lipoarabinomannan from *Mycobacterium indicus pranii* shows immunostimulatory activity and induces autophagy in macrophages. **PLOS One** doi: 10.1371/journal.pone.0224239.

63. Singh S, Gupta K, Shukla S, Sampathkumar S-G, Roy RP (2019) Sortase-click strategy for defined protein conjugation on a heptavalent cyclodextrin scaffold. **PLOS One**, doi:10.1371/journal.pone.0217369.

64. Srivastava A, Garg S, Jain R, Ayana R, Kaushik H, Garg L, Pati S, Singh S.(2019) Identification and functional characterization of a bacterial homologue of Zeta toxin in *Leishmania donovani*. **FEBS Lett.** doi: 10.1002/1873-3468.13429.

65. Srivastava S, Battu MB, Khan MZ, Nandicoori VK, Mukhopadhaya S (2019) *Mycobacterium tuberculosis* PPE2 protein interacts with $p67^{phox}$ and inhibits ROS production. **J Immunol.** 203: 1218-1229.

66. Tripathi P, Singh LK, Kumari S, Hakiem OR, Batra JK. (2020) ClpB is an essential stress regulator of *Mycobacterium tuberculosis* and endows survival advantage to dormant bacilli. **Int J Med Microbiol**. 23: 151402.

67. Tripathi V, Kaur K, Kharat SS, Hussain M, Damodaran AP, Kulshrestha S, Sengupta S (2019). Abrogation of FBW7α-dependent p53 degradation enhances p53's function as a tumor suppressor. **J Biol Chem.** 294: 13224-13232.

68. Vaish U, Kumar AA, Varshney S, Ghosh S, Sengupta S, Sood C, Kar HK, Sharma P, Natarajan VT, Gokhale RS, Rani R (2019) Micro RNAs upregulated in Vitiligo skin play an important role in its aetiopathogenesis by altering TRP1 expression and keratinocyte-melanocytes cross-talk. **Sci Rep**. doi: 10.1038/s41598-019-46529-6.

69. Verma S, Kang AK, Pal R, Gupta SK (2020) BST2 regulates interferon gamma-dependent decrease in invasion of HTR-8/SVneo cells via STAT1 and AKT signaling pathways and expression of E-cadherin. **Cell Adh Migr.** 14: 24-41.

70. Yadav J, Dikshit N, Ismaeel S, Qadri A (2020) Innate activation of IFN-γ-iNOS axis during infection with *Salmonella* represses the ability of T cells to produce IL- 2. **Front Immunol.** doi: 10.3389/fimmu.2020.00514.

REVIEWS/PROCEEDINGS/CHAPTERS

1. Bhaskar S, Singh B (2019) Immunotherapeutic potential of *Mycobacteriumindicus pranii* against tuberculosis. In: ***Mycobacterium tuberculosis*: Molecular infection biology, pathogenesis, diagnostics and new interventions** (Eds. Hasnain S, Ehtesham N, Grover S, Springer, Singapore) pp 407-417.

2. Bhaskar A, Dwivedi VP, Nandicoori VK (2019) Eliminating mycobacterial persistence: novel targets for anti-TB therapy. In: **Pathogenicity and Drug Resistance of Human Pathogens** (Eds. Hameed S, Fatima Z, Springer) pp 57-81.

3 Bhattacharya I, Sen Sharma S, Majumdar SS (2019) Pubertal orchestration of hormones and testis in primates. **Mol Reprod Dev.** 86: 1505-1530.

4. Bose A, Sharma H, Pal R (2019) Review of the "Annual Review of Immunology, Volume 35, 2017". In: **Curr Sci.** 116 pp 1021-1024.

5. Kalha B, Sachdeva R, Bose A, Sarkar M, Sharma H, Malik M, Pal R (2020) Review of the "Annual Review of Immunology, Volume 36, 2018". In: **Curr Sci.** 118 pp 480-485.

6. Mishra R, Lata S, Ali A, Banerjea AC (2019) Dengue haemorrhagic fever: a job done via exosomes? **Emerging Microbes Infect.** 8: 1626-1635.

7. Sachdeva R, Singh P, Bose A, Kalha B, Sarkar M, Pal R (2019) Anticancer immunotherapy: Prospects and challenges. In: **Unravelling Cancer Signaling Pathways: A Multidisciplinary Approach** (Eds. Bose K and Chaudhari P, Springer Nature, Singapore) pp 189-228.

8. Shaha C (2020) Foreword. In: **Clay, Craft, Music and Science: Purnima Sinha's Life** (Eds Singh R, Roy SC, Shaker Dueren, Germany) pp ix-xi.

9. Singhvi P, Saneja A, Srichandan S, Panda AK (2020) Bacterial inclusion bodies: A treasure trove of bioactive proteins. **Trends Biotechnol.** doi: 10.1016/j.tibtech.2019.12.011.

10. Toor D, Wasson MK, Kumar P, Karthikeyan G, Kaushik NK, Goel C, Singh S, Kumar A, Prakash H (2019) Dysbiosis disrupts gut immune homeostasis and promotes gastric diseases. **Int J Mol Sci.** doi: 10.3390/ijms20102432.

PATENTS

1. Kaushik H, Deshmukh SK, Mathur DD, Garg LC (2020) Development of vaccine against epsilon toxin of *Clostridium perfringens* using peptides corresponding to immunodominant epitopes of epsilon toxin (Indian Patent no. 333416 granted on February 28, 2020)
2. Anish CK, Khan N, Sehgal D, Panda AK (2020) Design and development of nanoparticles based carbohydrate vaccine against Streptococcus pneumonia (Indian Patent no. 332055 granted on 14/02/2020)
3. Gupta S, Surolia A, Gautam RK, Diwedi VK (2020) Synthetic peptides and random copolymers for the treatment of autoimmune disorders. (Indian Patent no. 328267 granted on 27/12/2019)
4. Roy RP, Samantaray S (2019) India novel bioconjugates as therapeutic agent and synthesis thereof. (Indian Patent no. 320958 granted on September 20, 2019)
5. Garg LC, Dixit A, Gopal K (2019) Recombinant nontoxic protein vaccine against *Clostridium perfringens* infection and epsilon toxin Intoxications. (Indian Patent no 319556 granted on August 30, 2019).
6. Gupta SK, Shembekar N, Mishra A, Varadarajan R, Aditya VV, Subhash M, Kapre V, Yeolekar L, Dhere R (2011) Monoclonal antibody specific to hemagglutinin from influenza virus h1-subtypeand uses thereof. (Indian Patent no 312710 granted on August 22, 2019).
7. Chakkumkal A, Panda AK (2019) Vaccine composition capable of inducing memory antibody response from single point immunization. (US Patent application no. 14/122,923 granted on July 30, 2019)
8. Polachira SK, Nair R, Jayalekha R, Gupta SK, Mishra NN, Agarwal A (2019) Herbal microbicide formulation for preventing HIV (Indonesian Patent application no. P00201907700 filed on December 9, 2019)
9. Polachira SK, Nair R, Jayalekha R, Gupta SK, Mishra NN, Agarwal A (2019) Herbal microbicide formulation for preventing HIV. (South African Patent application filed in 2019)
10. Polachira SK, Nair R, Jayalekha R, Gupta SK, Mishra NN, Agarwal A (2019) Herbal microbicide formulation for preventing HIV (ARIPO Patent Application filed in 2019)
11. Solanki P, Lakshmi GBVS, Kumar A (2019) A novel detection method for trimethyl – oxide (Indian Patent application no. 201911044566 filed on November 04, 2019)
12. Solanki P, Sri S, Lakshmi GBVS, Kumar A (2019) Novel fluorescence-based toggle sensor for detection of antibiotics (Indian Patent application no. 201911042412 filed on October 18, 2019)
13. Singh A, Verma J, Ahuja R, Panda AK (2019) A method for fabrication of bilayered PDLLA-Gelatincomposite scaffold for tissue regeneration. (Indian Patent application no. 201911036222 filed on September 9, 2019)
14. Meena J, Panda AK (2019) A highly efficient polymer particulate vaccine formulation entrapping admixture of alum and antigen. (Indian Patent application no. 201911036242 filed on September 9, 2019)
15. Singh A, Panda AK (2019) A process for fabrication of transparent polymeric scaffold for tissue engineering applications. (Indian Patent application no. 201911036223 filed on September 9, 2019)

Ph.D. DEGREES AWARDED TO NII SCHOLARS Annexure-III

Thirty two scholars of the Institute were awarded the degree of Doctor of Philosophy by Jawaharlal Nehru University on the completion of their work. The details are as follows:

S.No.	Student's Name	Topic of Research	Guide
1	Ms. Bhavya Jha	Structural and biochemical studies of histidinol phosphate phosphatase from *Mycobacterium tuberculosis*	Dr. B.K. Biswal
2	Mr. Zaffar Equbal	Stage specific differentiation of human mesenchymal stem cells into neurons and their characterisation	Dr. Madhulika Srivastava Dr. Pushkar Sharma
3	Ms. Surbhi Goswami	Chemical and biological modulation of glycoforms of sialoglycoconjugates and their functional consequences	Dr. SG. Sampathkumar
4	Ms. Basanti Malakar	Elucidating phosphorylation mediated regulation of secretion and function of effectors, CFP10 & ESAT6 in *Mycobacterium tuberculosis* virulence	Dr. Vinay K.Nandicoori
5	Mr. Shubhendu Trivedi	Modulation of innate immune signaling by HIV-1 via TRAFs	Dr. P.B. Tailor Dr. A.C. Banerjea
6	Ms. Sonam Verma	Role of interferon gamma in regulating invasion of trophoblastic cells	Dr. Rahul Pal Dr. S.K. Gupta
7	Ms. Saishruti Kohli	Unravelling the molecular determinants of SIRT6 tumor suppressor functions	Dr. Sanjeev Das
8	Ms.Usha Yadav	Understanding the lipoic acid synthesis pathway of *Leishmania major*	Dr. Monica Sundd
9	Ms. Sonia Verma	Molecular characterization of a fluoride resistance gene in *C. elegans* longevity	Dr. Arnab Mukhopadhyay
10	Ms. Mansi Grover	In silico analysis of long non-coding RNAs and architectural proteins associated with epigenetic regulation	Dr. Debasisa Mohanty
11	Ms. Irene Saha	Understanding the role of NF-κB family member RelB in dendritic cell diversity	Dr. P.B. Tailor
12	Mr. Sachendra Singh Bais	Investigating the role of canonical NF-κB signaling in host cell responses to RNA viruses	Dr. Soumen Basak
13	Mr. Mohd. Anees Ahmed	Understanding specificity of anti-*Salmonella* immune responses and their role in immunity	Dr. Ayub Qadri
14	Ms. Vandita Dwivedi	Modulation of glycoforms of cell surface molecules by N-acetyl-D-galactosamine (GalNAc) analogues and its functional consequences	Dr. S.Gopalan Sampathkumar
15	Ms. Raksha Devi	Understanding the role of Sld5 in maintaining centrosome structure	Dr. Sandeep Saxena
16	Mr. Praveen Kumar	Understanding the microRNA-gene regulatory networks during DNA damage	Dr. Sandeep Saxena

S.No.	Student's Name	Topic of Research	Guide
17	Ms. Suman Gupta	Analysis of innate and adaptive immune components in the maintenance of gut homeostasis	Dr. Anna George
18	Ms. Beneeta Kalha	Delineation of molecular pathways involved in gonadotropin-mediated chemoresistance in tumor cells	Dr. Rahul Pal
19	Ms. Afshana Quadiri	Characterization of the host immune responses against a malaria liver stage subunit vaccine candidates SLTRIP	Dr. Agam P. Singh
20	Mr. Danish Umar	Analysis of temperature-mediated modulation of T-cell functions	Dr. Anna George
21	Ms. Hritika Sharma	Consequences of immune recognition of hemoglobin in lupus	Dr. Rahul Pal
22	Ms. Anita Goyala	Deciphering the role of *Caenorhabditis elegans* p53 like-1 gene (cep-1) in dietary restriction-mediated longevity assurance	Dr. Arnab Mukhopadhyay
23	Mr. Pitale Durgesh Manohar	Understanding the early events in *Leishmania* infection	Dr. Soumen Basak
24	Ms. Himanshi Agarwal	Understanding the role of BLM helicase during DNA double-strand break response	Dr.Sagar Sengupta
25	Mr. Vineet	Human arginase-I: revealing the role of metal ions, heat activation and macromolecular crowding on enzyme stability and activity	Dr. Apurba Kumar Sau
26	Ms. Mehak Zahoor Khan	Unraveling the functional facets of protein kinase G (PknG) and *actinomycetes* oxidative stress response regulator (AosR) in mycobacterial stress response.	Dr. Vinay K. Nandicoori
27	Ms. Akansha Singh	Design and evaluation of composite scaffold for tissue engineering applications	Dr. Amulya K. Panda
28	Ms. Preeti Attri	Investigating the role of BLM in the regulation of histone modifications after DNA damage	Dr. Sagar Sengupta
29	Ms. Ankita Dutta	Understanding the structure, function and regulation of *helicobacter pylori* arginase	Dr. Apurba K.Sau
30	Ms. Chandni Sood	Role of Rab18 in regulation of phagosome maturation in macrophages	Dr. Soumen Basak
31	Ms. Richa Kumari	Deciphering the role of PKM2 in oncogenesis	Dr. Sanjeev Das
32	Ms. Prity Yadav	Functional and structural aspects of sortases	Dr. R.P. Roy

DISTINCTIONS/HONOURS/FELLOWSHIPS

Dr. Vinay Kumar Nandicoori was conferred the JC Bose National Fellowship 2019.

Dr. Nirmala Jagadish conferred OPPI Woman Scientist Award.

Dr. Soumen Basak received Shanti Swarup Bhatnagar Prize (SSB) in Biological Sciences (2019).

Dr. Arnab Mukhopadhyay was selected as fellow of The National Academy at Science, India (NASI). He also received the Science and Technology Award for Research - SERB STAR.

LECTURES AND EVENTS

Foundation Day Lecture

The 33rd Foundation Day of NII was celebrated on 6th October, 2019 at the Institute. **Prof. Anil K. Gupta** (Visiting Faculty, IIM Ahmedabad & IIT Bombay, Founder, Honey Bee Network, SRISTI, GIAN and NIF, CSIR Bhatnagar Fellow) was invited as a Guest of Honour. He delivered a lecture on **"Scientific innovation with social and empathetic responsibility"**.

Dr. Amulya K. Panda, Prof. G.P. Talwar, Prof. Anil K. Gupta and Dr. Renu Swarup (Secretary, DBT) on the occasion.

The NII Auditorium was re-christened the "GP Talwar Auditorium" in recognition of Prof. Talwar's contributions to science, and to the establishment of the Institute.

Memorable moments with Prof. G.P. Talwar, Mrs. Talwar, Dr. Renu Swarup (Secretary, DBT), Dr. Amulya K. Panda at the re-christening ceremony of the NII Auditorium.

DBT Foundation Day Celebrations

The 34th Foundation Day of Department of Biotechnology was celebrated on 26th February, 2020 at NII.

Dr. Harsh Vardhan (Minister of Health and Family Welfare) with other dignitaries on the occasion.

Science Popularization Programme

NII conducted a science popularization programme for school- and college- going children on 30th May, 2019. The students of Delhi Public School, Mason's Public School and Deen Dayal Upadhyaya College were appreciative of both the lectures delivered by members of the NII Faculty and the lab visits.

Dr. Amulya K. Panda with students and members of the NII Faculty on the occasion.

Road Show: Global Bio India 2019

As a prelude to Global Bio India 2019, a Road Show was held at NII on 11th November, 2019. Lectures by members of the NII Faculty as well as laboratory visits were organized.

Dr. Amulya K. Panda, Dr. Anil K Suri, Dr. Gopalan Sampathkumar and Lt. Col. (Dr.) D. K Vashist with participants.

5th International Yoga Day

On the occasion of the 5th International Yoga Day (21st June, 2019). Dr. Guru Deo, (Morarji Desai National institute of Yoga (MDNIY), New Delhi) delivered a lecture on the "Role of diet in yoga practice". Mr. Tanmay demonstrated Yoga skills.

Scientists, students and administrative staff participated in a one-hour long Yoga session. Apart from conducting the exercises, Dr. Deo also spoke about the health benefits of each asana. The instructors educated the participants about the importance of stress-free living and appropriate diet in Yoga.

Dr. Guru Deo and Mr. Tanmay with Lt. Col.(Dr.) D.K. Vashist (Senior Manager), Ms. Chandresh Bhagtani (Administrative Officer) on the occasion

INVITED SEMINARS

S. No	Topic	Speaker Detail	Date
1	Emerging advances in cellular immunotherapy: Challenges in meeting global demand	Prof. Rajiv Khanna Group Leader, Tumour Immunology Laboratory QIMR Berghofer Medical Research Institute, Australia	02.04.2019
2	Ser/Thr/Tyr kinase and phosphatase-mediated post-translational modifications in *Streptococcus pyogenes*: Implications on bacterial virulence and pathogenesis	Dr. Vijay Pancholi The Ohio State University Columbus, OH, USA	09.04.2019
3	Arising frontiers in the robustness of bacterial-bacterial and gut bacterial-host cell communication	Dr. Gyanendra P. Dubey Molecular Microbial Pathogenesis Unit, Institut Pasteur, Paris	25.04.2019
4	Distinct roles of PD-1 in T cell exhaustion and memory	Dr. Vandana Kalia University of Washington and Seattle Children's Research Institute, USA	26.04.2019
5	A molecular journey to free energy landscapes of amyloid forming α-synuclein fibrils	Dr. Divya Nayar Centre for Computational and Data Sciences (CCDS), IIT Kharagpur, Kharagpur	24.05.2019
6	Mycobacterial biofilms: Are they relevant *in vivo?*	Dr. Ashwani Kumar Principal Scientist Institute of Microbial Technology, Chandigarh	07.06.2019
7	Analysis of antigen receptor sequences of a unique lymphocyte reveals a T cell-neoantigen encoded in a public BCR of TD patients	Dr. Rizwan Ahmed Post-Doctoral Fellow Department of Pathology Division of Immunology, Johns Hopkins University , Baltimore, USA	18.06.2019
8	A philosophical reconstruction of clinical science in cancer: Are personalized treatment plans application or construction of knowledge?	Dr. Alok Srivastava CeeTOC Inc., San Francisco & Visiting Researcher Philosophy, UC Davis, USA	26.07.2019
9	Innate immune route to inflammation	Dr. Vijay Rathinam, D.V.M., Ph.D. Assistant Professor of Immunology and Associate Director of Immunology Graduate Program University of Connecticut Health School of Medicine, Farmington, USA	26.07.2019
10	Intestinal infection regulates immunity, behavior and learning in *C. elegans.*	Dr. Jogender Singh Department of Molecular Microbiology & Immunology Oregon Health & Science University, Portland, USA	02.08.2019

S. No	Topic	Speaker Detail	Date
11	Integrating computational methods and experimental data for understanding the binding affinity of protein-protein complexes	Prof. M. Michael Gromiha Department of Biotechnology IIT Madras, Madras	02.08.2019
12	Cancer: Molecular mechanisms and therapeutic implications	Dr. Archita Ghoshal Penn State College of Medicine, USA	08.08.2019
13	O-GlcNAcylation: linking metabolism to epigenetics	Dr. Vaibhav Kapuria Center for Integrative Genomics University of Lausanne, Switzerland	23.08.2019
14	Innate-like T cells: Moving at the frontline	Dr. Shilpi Chandra Division of Developmental Immunology La Jolla Institute for Allergy and Immunology San Diego, USA	06.09.2019
15	HIV envelope-based vaccine design for the induction of broadly neutralizing antibodies	Dr. Rajesh Ringe Ramalingaswami Fellow Institute of Microbial Technology, Chandigarh	13.09.2019
16	MechanoImmunology – Exploring physical drivers of immune cell polarization during inflammation and disease	Dr. Nikhil Jain Department of Health Science and Technology ETH Zurich, Switzerland	17.09.2019
17	Oncogenes and their role in shaping the tumor-microenvironment	Dr. Sushil Nehra Department of Obstetrics and Gynecology University of Pennsylvania Philadelphia, PA, USA	24.09.2019
18	Understanding of phospho-signalling pathways in regulation of malaria parasite survival	Dr. Mahmood M. Alam Lord kelvin/Adam Smith (LKAS) fellow Wellcome Centre for Integrative Parasitology Institute of Infection, Immunity and Inflammation, University of Glasgow, UK	25.09.2019
19	Host pathogen interaction and mathematical modeling	Dr. Koushik Roy Department of Microbiology, Immunology and Molecular Genetics University of California, Los Angeles, USA	04.10.2019
20	Mechanistic insight into understanding the translational aspects of autophagy in cancer	Dr. Suresh Kumar Department of Molecular Genetics and Microbiology University of New Mexico, Albuquerque, USA	11.10.2019
21	Improving the efficacy of immune checkpoint blockade in lung cancer	Prof. Vivek Mittal Director Neuberger Berman Lung Cancer Laboratory Weill Cornell Medical College of Cornell University, New York, USA	22.10.2019
22	A network perspective on biologically-relevant chemical spaces	Dr. Areejit Samal, Reader Computational Biology Group, The Institute of Mathematical Sciences Chennai	05.11.2019

S. No	Topic	Speaker Detail	Date
23	DNA repair, neurodegeneration and aging	Dr. Vilhelm Bohr Chief Laboratory of Molecular Gerontology National Institute of Aging National Institutes of Health, USA	21.11.2019
24	A CRISPR-Cas9 screen reveals novel mechanisms of PD-L1 regulation	Dr. Shruthy Suresh Aggarwal Department of Molecular Biology, University of Texas Southwestern Medical Center Dallas, Texas, USA	05.12.2019
25	Congenital disorders of glycosylation: Structure and function of oligosachharyl transferase function	Prof. Smita Mohanty Professor of Chemistry Oklahoma State University USA	09.12.2019
26	Microbiome and metabolome as drivers of HIV persistence	Prof. Rafick-Pierre Sékaly Case Western Reserve University School of Medicine Department of Pathology Cleveland, OH, USA	19.12.2019
27	Extraterrestrial viruses, fishy research, cancer models and health without borders - a professional trajectory of interconnectedness. And beyond…	Dr. Alok Deoraj Florida International University Miami FL, USA	20.12.2019
28	Targeting NF-κB for cancer immunotherapy	Dr. Sankar Ghosh Chairman and Silverstein and Hutt Family Professor Department of Microbiology & Immunology Columbia University, New York, USA	27.12.2019
29	Heme trafficking from the ground-up: Lessons from bloodless worms	Dr. Iqbal Hamza Professor Dept. of Animal & Avian Sciences University of Maryland, MD, USA	08.01.2020
30	Understanding the immune mechanisms of neuroinflammation and neurodegeneration	Dr. Deepak Kumar Kaushik Hotchkiss Brain Institute University of Calgary, Canada	24.02.2020
31	Dynamic activation and regulation of MAP kinase p38	Dr. Senthil K. Ganesan University of Arizona, Department of Chemistry and Biochemistry, Tucson, AZ, USA	02.03.2020
32	From structure to drug discovery	Dr. Pankaj Kumar Chauhan Department of Biochemistry Jamia Hamdard University Hamdard Nagar, New Delhi	06.03.2020
33	Therapeutic targeting of pericytes in vascular diseases	Dr. Mitrajit Ghosh Centre for Healthcare Science and Technology (CHST) Indian Institute of Engineering Science and Technology (IIEST), Shibpur, Howrah	12.03.2020

NII FACULTY AND Ph.D SCHOLARS LECTURE SERIES

April 2019 to March 2020

S. No	Topic	Speaker Detail	Date
1	Bacterial inclusion bodies	Dr. Amulya K. Panda	05.09.2019
2	Evaluation of long non-coding RNA (lncRNA) mediated regulation of sertoli cell function	Ms. Ayushi Jain Ph.D Scholar, 2015 batch	12.09.2019
3	Dissecting out the functions of *M. tuberculosis* membrane proteases: A relatively unexplored area	Dr. Bichitra Biswal	19. 09.2019
4	hDAC5 deacetylates SATBI To duppress tumorigenesis Investigating the role of RelB in anti-viral immune response	Ms. Shalakha Sharma Ph.D Scholar, 2015 batch Ms. Yashika Ratra Ph.D Scholar, 2015 batch	26. 09.2019
5	Cell signaling in *Mycobacterium tuberculosis*	Dr. Vinay K. Nandicoori	03.10.2019
6	CD8 T-Cell influences the humoral immunity establishment to live attenuated Japanese Encephalitis vaccine Understanding the mechanisms for mitochondrial dysfunction in cells lacking RECQL4, the gene mutated in Rothmund Thomson Syndrome	Ms. Anurag Kalia Ph.D Scholar, 2015 batch Mr. Aamir Khan Ph.D Scholar, 2015 batch	10.10.2019
7	Metabolic control of cellular signaling and gene expression	Dr. Arnab Mukhopadhyay	17.10.2019
8	Immunological evaluation of nanoparticle-based pneumococcal antigens Gleaning insight into B-cell biology: Preliminary comparative sequence analysis of anti-polysaccaride antibody response in vaccinees	Ms. Mamta Ph.D Scholar, 2015 batch Ms. Hema Sori Ph.D Scholar, 2015 batch	24.10.2019
9	Altering glycosylation in mammalian brain by stealth	Dr. S.G. Sampathkumar	31.10.2019
10	Understanding the role of monocytes in hepatitis B infection Role and regulation of E3 ligase itch in neuronal apoptosis	Ms. Prakriti Sinha Ph.D Scholar, 2015 batch Ms. Monika Chauhan Ph.D Scholar, 2015 batch	07.11.2019
11	Experiences and learning from clinical diagnostics	Dr. P K Upadhyay	14.11.2019
12	Insight into the management of histidine requirements by *Mycobacterium tuberculosis* during the course of infection Investigating the role of Sld5 in regulating the centriolar satellites	Ms. Anam Ashraf Ph.D Scholar, 2015 batch Mr. Vipin Kumar Ph.D Scholar, 2015 batch	21.11.2019
13	Understanding the regulation of arginine metabolism in *Helicobacter pylori*: A Structure-function study	Dr. A K Sau	28.11.2019

S. No	Topic	Speaker Detail	Date
14	Profiling b-O-GlcNAc modifications on FoxP3 Understanding of hemoglobin receptor recycling in *Leishmania*	Ms. Ahana Addhya Ph.D Scholar, 2015 batch Mr. Irshad Ansari Ph.D Scholar, 2015 batch	05.12.2019
15	Human $CD4^+$ T cell memory and infectious diseases	Dr. Veena Patil	12.12.2019
16	Study the macrophage function and underlying mechanism in TB-IRIS development using T cells deficient mice as animal model In silico analysis of mycobacterial lipid remodeling enzymes	Mr. Lalit Pal Ph.D Scholar, 2015 batch Mr. Bhushan Dhamale Ph.D Scholar, 2015 batch	19.12.2019
17	The art of breaking and making peptide bonds	Dr. R.P. Roy	26.12.2019
18	Analysis the influence of CTCF on regulation of TCRB locus Investigating the role of CDK-12 in aging and germline development under low insulin signaling condition	Ms. Monika Ph.D Scholar, 2015 batch Mr. Gautam Chandra Sarkar Ph.D Scholar, 2015 batch	02.01.2020
19	From immunological memory to protective immunity: Our journey with *Streptococcus pneumoniae*	Dr. Devinder Sehgal	09.01.2020
20	Understanding the role of osmolality in the process of osteogenesis Understanding the role of GTB hydrolysis by hGBP3 and its splice variant hGBP3 C in antiviral activity	Ms. Madhu Baghel Ph.D Scholar, 2015 batch Ms. Sowmiya Gupta Ph.D Scholar, 2015 batch	09.01.2020
21	Peptide-MHC based nanomedicine for reprogramming of regulatory network	Dr. Santiswarup Singha	23.01.2020
22	Effect of glycosylation on HAL-2, an alpha helical antimicrobial peptide GXXGXXXG motif Plays a role in acyl chain sequestration by fungal type I acyl carrier protein	Ms. Gagandeep Kaur Ph.D Scholar, 2015 batch Ms. Garima Ph.D Scholar, 2015 batch	30.01.2020
23	Novel patterns of ribosome pausing in *Mycobacterium tuberculosis*	Dr. Aneeshkumar A.G.	06.02.2020
24	Organizing the loops of life: Understanding CTCF at work	Dr. Madhulika Srivastava	05.03.2020
25	Analyzing the signaling network regulating inflammation: A computational biology approach Effects of immune dysregulation and development of disease regulating strategies for retinitis pigmentosa	Mr. Manti Kumar Saha Ph.D Scholar, 2017 batch Ms. Varsha K. Mohan Ph.D Scholar, 2017 batch	12.03.2020

CONFERENCES/SYMPOSIA/WORKSHOPS

DBT-BIRAC Leadership Programme

Prof. Eric Green (Director, National Human Genome Research Institute, National Institute of Health, Bethesda, USA) delivered a DBT-BIRAC Leadership Dialogue Series lecture on "from the human genome project to precision medicine: A journey to advance human health" on 8th January, 2020.

Prof. Eric Green, Dr. Renu Swarup and Dr. Amulya K. Panda with other scientists.

DBT-NIAID Vaccine Adjuvant Science Collaboration Training Workshop

A DBT-NIAID Vaccine Adjunt Science Collaboration Training Workshop was held from 10th to 11th April, 2019.

Participants at the Workshop.

World Immunology Day - 'Immunology Today' Symposium

The World Immunology Day was celebrated on 29th April, 2019. The theme of the inaugural celebration was 'Immunology Today'. Students from all across the Delhi-NCR region from several colleges and Institutes participated in the Symposium. After the introductory speech by Dr. Amulya K. Panda, five lectures on topics in contemporary immunology were presented. Five Ph.D. scholars were also given the opportunity to showcase their work. Dr. Nimesh Gupta acted as moderator and facilitated interaction between school students and the speakers. The day concluded with an immunology quiz.

Dr. Amulya K. Panda, with members of the Faculty and other scientists on the occasion.

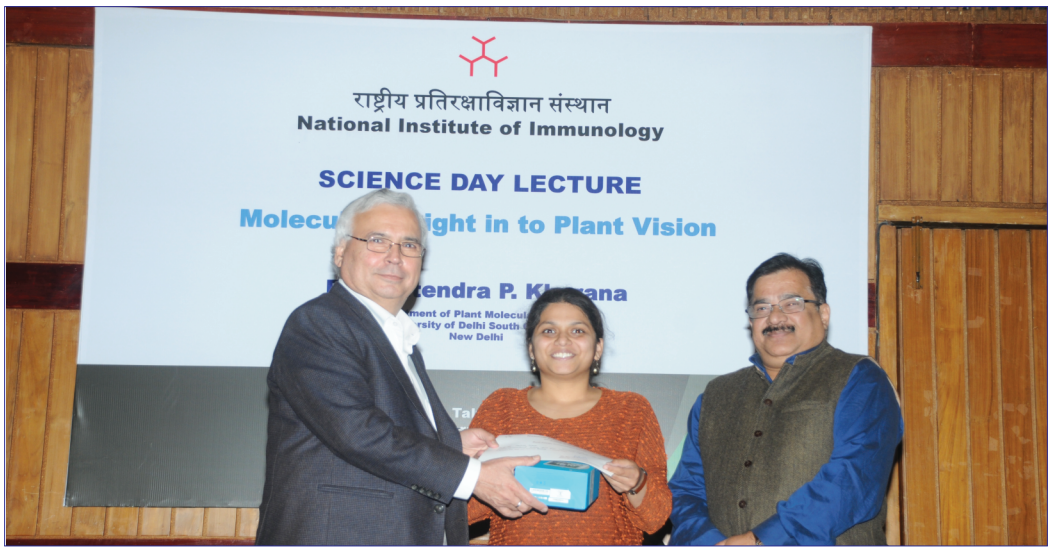
Hands-on Training Workshop for FACS Data Analysis

A hands-on Training Workshop on flow cytometer data analysis was organised by Dr. Nimesh Gupta on October 11th, 2019. The Workshop focused on the advances in FACS data analysis and hands-on training on FlowJo Software. A total 75 participants, (Ph.D. scholars and young scientists) from across research institutes in the Delhi-NCR region received training. Dr. Keefe Chee, (Life Sciences Institute, National University of Singapore) and Dr. Nimesh Gupta, delivered the lectures.

Participants at the data analysis software training session.

National Science Day

National Science Day was celebrated on 28th February, 2020. Ph.D. students and research scholars celebrated the day with great fervour. The day constitutes a major science festival in NII, during which Ph.D. students present posters describing their research. Prof. Jitendra P. Khurana (Department of Plant Molecular Biology, University of Delhi, South Campus, New Delhi), delivered a lecture on "Molecular insight in to plant vision". The day concluded with distribution of poster awards.



Prof. Jitendra P. Khurana and Dr. Amulya K. Panda honoring Best Poster award to Tripti Nair.

India EMBO Symposium

'Mycobacterial Heterogeneity And Host Tissue Tropism'.

The Symposium, jointly organized by NII and the International Centre for Genetic Engineering and Biotechnology from 11th- 15th February, 2020, focused on neglected and poorly-managed aspects of TB pathogenesis. An interdisciplinary and international group of 40 speakers and chairpersons, along with nearly 150 participants from different countries, were in attendence. Novel scientific insights that could form the basis for future modalities of treatment and diagnosis were discussed.

Dr. Renu Swarup and Dr. Amulya K. Panda, with other participants, during the inaugural function.

MoU SIGNED AND VISITORS TO THE INSTITUTE

MoU signed with INMAS (DRDO)

NII signed an MoU with the Institute of Nuclear Medicine of Allied Science (DRDO) on May 29th, 2019, to carry out collaborative research. The signatories were Dr. Amulya K. Panda and Dr. Tarun Sekhri (Director, INMAS)

Dr. Amulya K. Panda, Director, NII and Dr. Tarun Sekhri, Director, INMAS with the team.

Visitors under the Know India Programme

NII organized a visit for 54 overseas participants under the Know India Programme of the Ministry of External Affairs for Young Diaspora on August 13th, 2019.

Dr. Amulya K Panda and Lt. Col. (Dr.) D.K. Vashist Participants of the Know India Programme during their visit.

FAREWELL TO Ph.D. STUDENTS

The farewell function for Ph.D. students (Batch of 2014) with Staff Scientists was marked by the planting of a tree.

Ph.D. Students of the 2014 batch planting a tree alongside Dr. Amulya K. Panda and Dr. Rahul Pal.

SUPPORT UNITS

Small Animal Facility

The Small Animal Facility of the Institute is devoted to the humane care and breeding of experimental animals used in approved research. At present, the Small Animal Facility holds 104 mouse strains, including 89 mutant strains, 16 inbred strains and 1 out bred strain. In addition, the Facility also houses 6 rat strains, a stock of rabbit and guinea pigs.

The propagation of all defined strains is done in a three- tier system i.e., the Foundation Stock (FS), Pedigreed Expansion Stock (PES) and Production Stock (PS). Genetically modified mouse strains are bred either by 1.homozygous mutant (-/-) x homozygous mutant (-/-) 2. heterozygous mutant (-/+) x homozygous mutant (-/-) 3. heterozygous mutant (-/+) x heterozygous mutant (-/+).

Defined breeding protocols and careful management and husbandry procedures are followed to ensure the purity of murine stains. To maximize genetic purity and uniformity of mice, inbred strains are propagated and replaced periodically in a manner that minimizes the genetic drift and inbreeding depression. A random sample from a few breeders of foundation, expansion and production stocks are monitored with the help of a few microsatellite markers to ensure genetic purity. Several principal investigators also assist in the genotyping of transgenic and knockout mice strains.

Health monitoring program includes regular screening for pathogens, including hepatitis virus, parvovirus, norovirus, pnemonia virus, mycoplasma and Sendai virus; ELISA and PCR are employed. Bacterial pathogens such as *Pseudomonas aeroginosa, Streptobacillus moniliformis, Bordetella, Bronchiseptica, Citrobacter rodentitium, Pasteurella pneumotropica, Staphylococci* and *E.coli* are screened for using culture, using biochemical methods and PCR. Faecal samples are screened for the presence of sedimentation method for the presence of the syphacia and aspicularis species of endoparasites. Periodic FACS analyses are also carried out on immunodeficient mice to assess leakiness.

Procedures are in place to prevent transmission of infection between cages; these include careful handling of animals, washing using automated cage and bottle washers, use of sterilized corn cob bedding, autoclaving of cages and use of acidified autoclaved drinking water. The breeding and experimental colonies are maintained within a barrier system with individual ventilated cages. A veterinarian carries out necropsy/autopsy procedures on infected animals, if indicated. A recommended preventive schedule of medication is strictly followed to reduce the infections to the extent possible.

Primate Research Centre

The National Institute of Immunology has a dedicated Primate Research Centre. Macaques are bred for generation of in-house animals of known age for approved basic, pre-clinical and toxicological research.

Under the breeding programme, group mating is facilitated in large open pens. In these semi-natural conditions, food and water is provided *ad libitum*. Infants are weaned at the age of six to twelve months (depending on season and weight of infants) after which they are transferred to open enclosures/semi-natural housing for optimal growth, the development of the bones and muscles, and enhanced motor coordination. Monkeys are independently housed at puberty. To prevent cross-cage contamination or infection, strict hygienic procedures are followed. Animals are regularly monitored for tuberculosis, simian herpes virus and simian hepatitis virus. Animals who are unwell are isolated and treated. Primates are fed with standardised pellet feed. In addition, bread, soaked Bengal gram, vegetables and/or fruits are also given daily. Diet is regularly with vitamins and calcium in bread are given. The staff at PRC undergo an annual preventative health check up. All surgeries, treatments for injury and the administration of medication are performed by a registered veterinarian, and all procedures such as

immunizations, and biopsies are aided by experienced technical staff. A research laboratory at the Centre provides basic services to investigators. Clearance of the research proposals by the CPCSEA (after initial clearance from the Institutional Animal Ethics Committee) is necessary for conducting research on primates. Macaques have been employed in research related to infectious diseases, reproduction, endocrinology, immunology and contraception. Staffs ensure that all procedures are pain-free, with minimum stress to the animal, and all effort is made to keep the animals comfortable. There are seventeen open enclosures with swings and shelters, which are used for rehabilitation or socializing, All attempts are made to maximize residence in such enclosures.

OTHER SERVICE UNITS

Establishment, Personnel and General Administration Services

The Division continued to provide key support for optimally utilizing and integrating human and administrative resources aimed at realizing the vision of the Institute. During the reporting period, administrative support was provided for formulating policies and ensuring their effective implementation. Other key areas include handling service matters, recruitments, career development, foreign visit of scientists for training/conferences/bilateral exchange visits etc. staff welfare, post retirement dispensation, preparation and submission of periodic reports to the administrative ministry, liaisoning with them and preparing responses to parliament questions. To bolster capabilities and enhance productivity, the Institute periodically sponsors administrative and technical staff for training in recognized training Institutes.

The Institute's RTI Cell files the quarterly reports on the RTI portal. The Institute also has an effective grievance redressal mechanism to deal with public as well as staff grievance petitions, ensuring timely disposal of the grievances.

Financial and Accounting Services

The Division has been responsible for preparation of the annual budget, management of fund utilization, receipt and disbursement of all payments, internal auditing, getting accounts audited by statutory and CAG auditors, sending reports to funding agencies and recovery and remittance of TDS from salary and contractors, filling institutional income tax return, obtaining required exemptions from the Income Tax Department, maintaining bank accounts, management of trust for CPF, Gratuity Fund, and recovery and remittance of subscriptions of NPS.

Stores and Purchase Department

The Stores & Purchase Department of NII is responsible for procurement of chemicals, consumables, glassware, plasticware along with other required miscellaneous items. Items are procured by Stores Department-1 from local as well as international sources. The procurement function is overseen by a Purchase Committee comprising of three or more Scientists, the Finance & Accounts Officer and the Stores & Purchase Officer.

Engineering, Maintenance and Instrumentation Services

The Engineering Department of the Institute has been entrusted with all the engineering activities involving maintenance, services, and capital works. It has always been the endeavor of the Department to provide the best of services with the use of the latest/modern technology; as a result, systems are being continuously modernized. Major activities undertaken during the reporting year are as follows:

- Installation of 10 KW rooftop grid sharing solar system.
- Setting up of new laboratories and offices.
- Installation of LED lighting fixtures & retrofitting of LED lamps in existing fixtures.
- Installation of CCTV cameras.
- Replacement of PVC fills in cooling towers.
- Miscellaneous HVAC/Civil/Electrical work in the Small Animal Facility.
- Installation of floodlights in the playground.
- Replacement of compound lighting fixture with LED lighting fixtures.
- Replacement of cooling coil of AHUs.
- Creation of new parking space near JNU Gate and New Guest House.
- Finishing/painting works at terrace level of Main Building.
- Renovation works in a few apartments.
- Upgradation work in a few laboratories.
- Upgradation of Gym space in the community facility block.
- SITC of air washer for Small Animal Facility.
- Kitchen renovation work in the NII staff quarters at Dwarka.

The Department is currently working on the following projects:

- Re-carpeting & repairing of roads.
- Installation of LED lighting fixtures & retrofitting LED lamps in existing fixtures.

- Installation of a rain harvesting system.
- Replacement of cooling coil of AHUs.
- Refurbishment of an conditioning system with allied works at the New Animal Facility.
- Renovation work in a few existing apartments.
- Silicon treatment on exterior grit plaster
- Upgradation work in a few laboratories.

The Swachta Pakhwada team of NII with Dr. Amulya K. Panda.

Library and Documentation Services

The Library And Documentation Department is a service oriented supportive unit which works as a knowledge management centre. It provides information support to the scientific staff of the Institute, using both archival and contemporary digital resources.

The Library has a rich collection of books and journal ; many resources are accessible online by scientific staff and students. NII is a member of the DeLCON consortium project of the Department of Biotechnology. The Library coordinates procedures (both online and print) for the subscription of journals, as well as processes the payment of journal publication charges. The Library has computerized all its housekeeping activities. A searchable database, Web-Online Public Access Catalogue (Web-OPAC), is being maintained.

The Library has been involved in compiling, designing and printing the Parliamentary and Scientific Annual Reports of the Institute in Hindi and English. The Library perpares monthly pictorial research publications bibliometrics reports. Information on subscriptions new procurements and publications is regularly updated on the NII website.

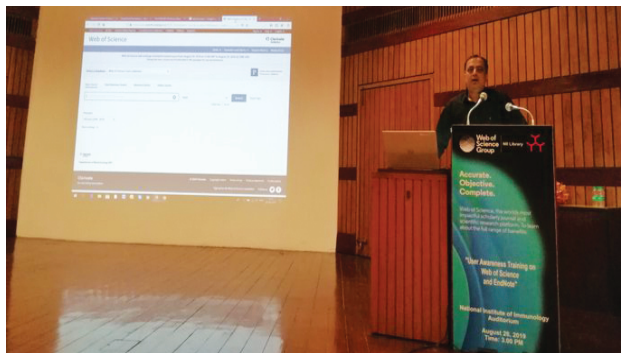
The Library maintains a searchable Institutional Digital Repository, containing full texts of articles published from NII from the year 2008. The Library also conducts an induction programme for new-comers, as well as workshops on various subjects such as the use of plagiarism, and Scopus software.

The Library is responsible for all the binding and photocopying work of the Institute. A Hindi Library, which houses a collection of hindi-books (including those dealing with administrative practices) and magazines, has been set up for popularizing the official language amongst staff of the Institute.

Resources

Eight reference books and ninety-three Hindi books have been added to the Library collection. The Library participates in organizing Institutional lectures such as the Foundation Day Lecture, and the National Science Day Lecture.

As a new initiative, the Library has set up Twitter, Blog and Facebook accounts of the Institute and posts regular updates. User awareness training on “Web of Science” and “EndNote” was organized on 28th August, 2019.



Lecture on use of “Web of Science” and “EndNote.”

Academic and Training Services

The activities of the Academic & Training Department have three major group viz. Students Affairs, Outside Training and In-House training. The Academic Department has been involved in organizing Ph.D. admissions, pre-Ph.D registration courses, Doctoral Committee meetings, Academic Committee meetings, and also coordinates the disbursal of fellowship to scholars. The Institute takes in scientists who have been awarded independent fellowships from the following

Institutes/organisations who then work under different Principal Investigators: Indian Institute of Science Bangalore (DBT-RA), ICMR (SRF/RA), DST-SERB (NPDF) DST-Inspire Faculty, DST (WOS) and CSIR (SRA/RA); DHR-young scientist and holder of the Ramalingaswami Re-entry Fellowship are also eligible. The Institute also imparts short-term training to Post-graduate students from different Universities/Institutions who are sponsored by the Indian Academy of Science Bangalore, for six-month project work. Under-graduate students belonging to different colleges also receive training under the Science Setu Programme. The Department has also been involved in arranging the participation of scientific, technical and administrative personnel in different training courses.

Vigilance Cell

The Institute has a Vigilance Cell headed by a Scientist nominated as part-time Chief Vigilance Officer (CVO) by the Central Vigilance Commission (CVC). The CVO and the support staff perform activities related to vigilance as adjunct duties to their primary responsibilities. The Cell has followed various instructions issued by the CVC from time to time to ensure effective implementation of the measures outlined in the instructions for strengthening vigilance and anti-corruption work. Emphasis is laid on preventive vigilance since such vigilance, if properly conceived and executed, aids in plugging weak and vulnerable areas. The Institute has been reviewing existing procedures to identify corruption-prone areas, making policies more transparent to avoid ambiguity and streamlining procedures to achieve a working environment free of corruption. The staff members employed in areas prone to corruption are rotated periodically. Sizeable purchases of chemicals, consumables and instruments are handled through various Purchase Committees of the Institute, thus eliminating the possibility of collusion detrimental to quality and price of purchases. Periodically, the Institutional Committees are reconstituted. The Cell has been rendering periodical reports and returns on vigilance activities to the administrative machinery and the CVC.

'Vigilance Awareness Week' was observed in the Institute from October 28th, 2019 to November 02nd, 2019. A banner announcing the observance of the Vigilance Awareness Week was put up at the main entrance of the Institute. Placards bearing slogans against corruption were displayed in the Institute. A pledge to fight corruption was taken by the NII community on October 29th, 2019. An Integrity Pledge was taken on the CVC website by members of the community. As essay writing competition was organized on October 31st, 2019 on the theme "Integrity- A Way Of Life". Shri T. P. Sharma (Under Secretary from the CVC) delivered a lecture on October 31st, 2019 on the theme of the Vigilance Awareness Week 2019.

Vigilance Officer Shri T. P. Sharma, (Under Secretary from the CVC) with Dr A. K Sau, (CVC , NII), Dr. A.K. Panda, Director, Lt. Col. (Dr.) D.K. Vashist, Senior Manager and Ms. Daisy Sapra Section Officer.

Computer Centre

The Computer Centre has been providing Information Technology-related support to the Institute, which involves managing switches and Wi-Fi controllers in a 1000 node LAN, system administration of multiple LINUX based E-mail and Web servers, backup services for mail/web servers, management of UTM devices for network security and integration of internet bandwidth from multiple ISPs. The Computer Centre staff facilitate day-to-day troubleshooting, maintenance and anti-virus support of about 850 PCs and other peripheral devices. In addition, the Computer Centre also provides specialized services like management of HPC clusters, managing floating licenses for access to bioinformatics softwares over LAN, and IT support for developing in-house software for pay roll and maintenance of employee databases.

SUMMARY OF NOTABLE ACTIVITIES

ACADEMIC COURSES, TRAINING PROGRAMMES AND INTERACTION WITH OTHER ACADEMIC INSTITUTES

The Institute imparts long-term residential training leading to a Ph.D. degree of the Jawaharlal Nehru University, New Delhi. From a large number of applicants from across the country, every year, 30-35 scholars are admitted to this Programme on a competitive basis after an examination and interview.

The Ph.D. programme of the Institute was launched in the academic year 1986-87. So far, 478 students have been awarded the Ph.D degree, including 32 who obtained the degree in academic year 2019-20.

In addition, the Institute accepts students from various Universities/Institutions as Summer Research Fellowship Awardees. The Institute also accepts students for the project work during the last semester of their Post Graduation course.

PUBLICATIONS

Eighty research papers by the scientists and scholars of the Institute were published this year. Of these publications, seventy were published in journals as peer-reviewed research papers and the others were published as reviews/proceedings. Details are listed in Annexure-I.

PATENTS AND TECHNOLOGY TRANSFER

The Institute has a policy of protecting intellectual property rights of inventions made within its laboratories. Early research leads are evaluated for commercial viability and patentability. The Institute files applications first in India and when necessary, at patent offices in other countries. During the year under report, the Institute has filed, eight patent applications, while seven patents were granted/ issued.

LECTURES DELIVERED ON INVITATION/PAPERS PRESENTED

The scientists of the Institute continued to deliver lectures including 'Keynote Addresses and Inaugural Addresses' 'Serial Lectures' at various institutions, conferences, symposia, workshops and training programmes in India and abroad.

LECTURES/SEMINARS BY VISITING SCIENTISTS/ GUEST INVESTIGATORS

The Institute continued to receive visiting scientists and guest investigators from all over the world. Thirty six seminars were organized by the Institute in areas of interest. These seminars were attended not only by the scholars and scientists of the Institute, but also by the investigators from other institutions.

ANTI-TERRORISM DAY

Anti-Terrorism Day was observed by employees on 21st May, 2019. At 11:00 AM anti-terrorism/ violence pledge was taken which stated that: “We, the people of India, having abiding faith in our country's tradition of non-violence and tolerance, hereby solemnly affirm to oppose with our strength, all forms of terrorism and violence. We pledge to uphold and promote peace, social harmony and understanding among all fellow human beings and fight the forces of disruption threatening human lives and values”.

SADHBHAVNA DIWAS

With the aim of promoting national integration and communal harmony among peoples of all religions, languages and regions, “Sadhbhavna Diwas” was observed on the birth anniversary of late Shri Rajiv Gandhi on 20th August, 2019 by taking the pledge: “I take this solemn pledge that I will work for the emotional oneness and harmony of all the people of India regardless of caste, region, religion or language. I further pledge that I shall resolve all differences among us through dialogue and constitutional means without resorting to violence”.

MARTYRS' DAY

Martyrs' Day was observed on 30th January, 2020 in memory of those who gave their lives in the struggle for India's freedom. A two-minute silence was observed at 11:00 AM.

RASHTRIYA EKTA DIWAS (NATIONAL UNITY DAY)

Rashtriya Ekta Diwas was observed on the Birth

Anniversary of Late Sh. Sardar Vallabhbhai Patel on 31st October, 2019. At 11:00 AM, a pledge was taken which stated that: "I solemnly pledge that I dedicate myself to preserve the unity, integrity and security of the nation and also strive hard to spread this message among my fellow countrymen. I take this pledge in the spirit of unification of my country which was made possible by the vision and actions of Sardar Vallabhbhai Patel. I also solemnly resolve to make my own contribution to ensure internal security of my country".

INDEPENDENCE DAY

Independence Day was celebrated on 15th August, 2019. The event was marked by a message from the Director, followed by singing of the National Anthem by the students and children of the staff of the Institute.

Dr. Amulya K. Panda addressing members of the Institute on Independence Day.

REPRESENTATIONS OF SCHEDULED CASTES, SCHEDULED TRIBES, OTHER BACKWARD CLASSES AND ECONOMICALLY WEAKER SECTIONS

The Institute complies with reservation orders as per directives of Government of India, while making appointments, to ensure representation of Scheduled Castes, Scheduled Tribes, Other Backward Classes and Economically Weaker Sections (EWS).

REPRESENTATION OF PERSONS WITH BENCHMARK DISABILITIES

The Institute follows reservation orders for Persons with Benchmark Disabilities as per Government of India directives issued from time to time to ensure representation appropriate.

IMPLEMENTATION OF OFFICIAL LANGUAGE POLICY

The official Language policy of the Govt. of India is followed by the Institute in letter and spirit:

1. To promote Hindi as official Language in official work, Hindi Pakhwara (Hindi Fortnight) was celebrated in the Institute with great zeal from 1st to 14th September, 2019. During this period, various competitions such as Hindi Sulekh (Hindi Writing), Hindi Shrutlek (Hindi Dictation), Hindi Samanya Gyaan (General Knowledge Competition), Hindi Vaad-Vivad (Hindi Debate), Hindi Nibandh (Hindi Essay), and Hindi Kavita Pathan (Hindi Poetry Recitation) were organized in which a large numbers of faculty members, staff members and students had participated; a Kavi sammelan was also held. Hindi Diwas (Hindi Day) was celebrated on 14th September, 2019 at the culmination of Hindi Pakhwara.

2. In order to reduce hesitation while doing official work in Hindi, the Institute organized quarterly Hindi workshops/lectures for employees during the year.

3. The Institute has implemented the Govt. of India scheme the writing of notes and drafts originally in Hindi. An incentive scheme for encouraging the writing of articles and research papers in Hindi on scientific and technical subjects was also implemented.

4. The Institute published the 3rd edition of its in-house magazine "JAIPRATIRAKSHA DARPAN" in Hindi in December, 2019 and the process for publishing the next edition is underway.

Organizers and participants at an event of the Hindi Pakhwara, and inauguration of the National Book Trust book stall by Dr. P. Tailor.

RTI ANNUAL RETURN INFORMATION SYSTEM (2019-2020)

NATIONAL INSTITUTE OF IMMUNOLOGY
NEW DELHI

Report on Monthly Disposal of Cases
2019-2020

Sl. No.	Year	Month	Opening Balance	Receipt	Disposal	Closing Balance	Cumulative Disposal
1.	2019	April	303	2	1	305	304
2.	2019	May	305	1	2	306	306
3.	2019	June	306	3	1	309	307
4.	2019	July	309	4	4	313	311
5.	2019	August	313	2	3	315	314
6.	2019	September	315	0	2	315	316
7.	2019	October	315	0	0	315	316
8.	2019	November	315	2	2	317	318
9.	2019	December	317	2	1	319	319
10.	2020	January	319	12	1	331	320
11.	2020	February	331	5	13	336	333
12.	2020	March	336	6	6	342	339

RTI ANNUAL RETURN INFORMATION SYSTEM (2019-2020)
ANNUAL RETURN FORM

Ministry /Department /Organization: Department of Bio-Technology (National Institute of Immunology), New Delhi-110067

Year 2019-2020 (upto March 2020)
Insert Mode (New Return)

		Progress in 2019-20			
	Opening Balance as on 01/04/2016	**Received during the year (including cases transferred to other Public Authority)**	**No. of cases transferred to other Public Authority**	**Decisions where request/appeals rejects/appeals rejected**	**Decision where requests/appeals accepted**
Request	303	44	0	0	44
First Appeal	1	0	0	0	0

No. of Cases where disciplinary action taken against any Officer	0

No. of CAPIOs designated	**No. of CPIO designated**	**No. of AAs designated**
	1	1

No. of times various provisions were invoked while rejecting request													
Relevant section of RTI Act 2005													
Section 8 (1)										Sections			
a	b	c	d	e	f	g	h	i	j	9	11	24	Others
0	0	0	0	0	0	0	0	0	0	0	0	0	0

Amount of Charges Collected (in Rs.)		
Registration Fee Amount	**Additional Fee & Any other charges**	**Penalties Amount**
Rs. 30	0	0

Last date of Uploading the Pro-active Disclosures on the website of PA	(Format 28/03 /2020)

Name of the person who is entering/updating data	Dr. Sarika Gupta

COMMITTEES OF THE INSTITUTE

(As on 31.03.2020)

NII SOCIETY

Prof. G. Padmanaban
President, NII Society
INSA Senior Scientist, Former Director,
IISc Bangalore & Senior Science
Innovation Advisor BIRAC, DBT

Dr. Renu Swarup
Chairperson, GB, NII &
Secretary, Department of Biotechnology
Ministry of Science & Technology
Government of India
New Delhi

Sh. B. Anand
Additional Secretary & Financial Adviser
Department of Biotechnology
Ministry of Science & Technology
Government of India
New Delhi

Sh. Chandra Prakash Goyal
Joint Secretary (Admin)
Department of Biotechnology
Ministry of Science & Technology
Government of India
New Delhi

Dr. Suchita Ninawe
Adviser/Scientist-'G',
Department of Biotechnology
Ministry of Science & Technology
Government of India
New Delhi

Prof. (Dr.) Rajiv Garg
Director General
Directorate General of Health Services
Ministry of Health & Family Welfare
Government of India
New Delhi

Prof. Balram Bhargava
Secretary, Department of Health Research &
Director General, Indian Council of Medical
Research
New Delhi

Prof. Randeep Guleria
Director
All India Institute of Medical Sciences
New Delhi

Prof. M. Jagadesh Kumar,
Vice-Chancellor
Jawaharlal Nehru University, New Delhi

Prof. M. Radhakrishna Pillai
Director
Rajiv Gandhi Centre for Biotechnology, Kerala

Dr. Debashis Mitra
Director
Centre for DNA Fingerprinting and Diagnostics,
Hyderabad

Ms. Kiran Mazumdar-Shaw
Chairperson & Managing Director
M/s Biocon Limited
Bangalore

Dr. Shiv Kumar Sarin
Director
Institute of Liver & Billary Sciences
New Delhi

Dr. Balvinder Shukla
Vice-Chancellor
Amity University, Noida, Uttar Pradesh
Senior Vice President, RBEF

Dr. Amulya K. Panda
Director
National Institute of Immunology
New Delhi

GOVERNING BODY

Dr. Renu Swarup
Chariperson
Secretary
Department of Biotechnology
Ministry of Science & Technology
Government of India, New Delhi

Sh. B. Anand
Additional Secretary & Financial Adviser
Department of Biotechnology
Ministry of Science & Technology
Government of India
New Delhi

Sh. Chandra Prakash Goyal
Joint Secretary (Admin)
Department of Biotechnology
Ministry of Science & Technology
Government of India
New Delhi

Dr. Suchita Ninawe
Adviser/Scientist-'G'
Department of Biotechnology
Ministry of Science & Technology
Government of India
New Delhi

Prof. (Dr.) Rajiv Garg
Director General
Directorate General of Health Services
Ministry of Health & Family Welfare
Government of India
New Delhi

Prof. Balram Bhargava
Secretary, Department of Health Research &
Director General, Indian Council of Medical Research
New Delhi

Prof. Randeep Guleria
Director
All India Institute of Medical Sciences
New Delhi

Prof. M. Jagadesh Kumar,
Vice-Chancellor
Jawaharlal Nehru University, New Delhi

Prof. M. Radhakrishna Pillai
Director
Rajiv Gandhi Centre for Biotechnology, Kerala

Dr. Debashis Mitra
Director
Centre for DNA Fingerprinting and Diagnostics,
Hyderabad

Ms. Kiran Mazumdar-Shaw
Chairperson & Managing Director
M/s Biocon Limited
Bangalore

Dr. Shiv Kumar Sarin
Director
Institute of Liver & Billary Sciences
New Delhi

Dr. Balvinder Shukla
Vice-Chancellor
Amity University
Noida, Uttar Pradesh
Senior Vice President, RBEF

Dr. Amulya K. Panda
Director
National Institute of Immunology
New Delhi

SCIENTIFIC ADVISORY COMMITTEE

Prof. P. Balaram
(Chairman)
Former Director, IISc and Professor
Molecular Biophysics Unit
Indian Institute of Science
Bangalore

Prof. G. Padmanaban
President, NII Society and INSA Senior Scientist &
Senior Science Innovation Advisor BIRAC
Department of Biochemistry
Indian Institute of Science
Bangalore

Dr. Ranjan Sen
Chief, Laboratory of Molecular Biology
& Immunology
Biomedical Research Centre
Room No. 06C-214, 251 Bayview
Boulevard, Suite 100
Baltimore, MD, USA

Prof. G.K. Rath
Chief, Dr. B.R. Ambedkar Institute-Rotary Cancer Hospital
Room No. 7, 2nd floor, Dr. B.R.A. IRCH, AIIMS
All Institute of Medical Sciences (AIIMS)
Ansari Nagar, New Delhi

Prof. (Dr.) Trinad Chakraborty
Professor of Medical Microbiology and Director
Institute for Medical Microbiology
Justus-Liebig-University Faculty of Medicine
-35392, Giessen, Germany

Dr. Apurva Sarin
Director
Institute of Stem Cell Biology and
-Regenerative Medicine & Head (Academics)
National Centre for Biological Sciences
Bangalore

Dr. V. Nagaraja
President
Jawaharlal Nehru Centre for Advanced Scientific Research
(A Deemed University) (JNCASR),
Jakkur, Bangalore

Prof. Shubhada. V. Chiplunkar
Director
Advanced Centre for Treatment, Research & Education in Cancer (ACTREC)
Tata Memorial Centre, Mumbai

Prof. Krishnendu Roy
Robert A. Milton Chair
Director, NSF Engineering Research Center (ERC)-for Cell Manufacturing Technologies (CMaT)
Georgia Institute of Technology
EBB 3018, 950 Atlantic Dr NW
Atlanta, GA, 30318, US

Prof. Rajiv Khanna AO FAHMS
Coordinator, QIMR-CIVD
Senior Principal Research Fellow (NH&MRC)
Group Leader, Tumour Immunology Laboratory
QIMR Berghofer Medical Research Institute
300 Herston Road, Herston QLD 4006
Locked Bag 2000 Royal Brisbane Hospital
QLD 4029, Australia

RESEARCH AREA PANEL

Prof. Saumitra Das
Professor, IISc, Bangalore & Director
National Institute of Biomedical Genomics
Nethaji Subhas Sanatorium (T.B. Hospital)
2nd Floor, 203, Barrakpore Trunk Road
Kalyani

Dr. Jaya S. Tyagi
Professor, Department of Biotechnology
All India Institute of Medical Sciences
AIIMS Campus, Ansari Nagar
New Delhi

Dr. Rajan Sankaranarayanan
Group Leader, Structural Biology Laboratory
CSIR-Centre for Cellular and Molecular Biology (CCMB)
Uppal Road,
Hyderabad

Prof. Raghavan Varadarajan
Professor, Molecular Biophysics Unit
Indian Institute of Science
Bangalore

Prof. Rajiv Bhat
Proffessor, School of Biotechnology
Jawaharlal Nehru University
New Delhi

Dr. Rinti Banerjee
Professor, Biomaterials and Bio-Interfaces Laboratory
Indian Institute of Technology
Mumbai

Dr. Sharmila A Bapat
Scientist-F,
National Centre for Cell Science
Pune University Campus, Pune

Prof. Yogendra Singh
Professor, Department of Zoology
University of Delhi
Delhi

Dr. Anuranjan Anand
Chairman, Molecular Biology & Genetics Unit (MBGU)
Jawaharlal Nehru Centre for Advanced Scientific Research
Jakkur, Bangalore

Dr. Jyotsna Dhawan
Chief Scientist
CSIR-Centre for Cellular and Molecular Biology (CCMB)
Uppal Road,Hyderabad

Dr. Shachi Gosavi
Professor
Institute of Stem Cell Biology and
Regenerative Medicine & Head (Academics)
National Centre for Biological Sciences
Bangalore

FINANCE COMMITTEE

Shri. B. Anand
Chairperson
Additional Secretary & Financial Adviser
Ministry of Science & Technology
Department of Biotechnology
New Delhi

Dr. Amit Sharma
International Centre for Genetic Engineering &
Biotechnology
New Delhi

Dr. Subhra Chakraborty
Staff Scientist
National Institute of Plant Genome Research
New Delhi

Dr. Amulya K. Panda
Director
National Institute of Immunology
New Delhi

BUILDING COMMITTEE

Shri Ashwani Nagar
(Chairperson)
Retired Principal General Manaer and Head of Civil
Engineering Division of
Department of Telecom

Director, NII
Member (Ex-Officio)
Ex-Officio Director
National Institute of Immunology
Aruna Asaf Ali Marg
New Delhi

Joint Secretary (Admin),
DBT or his nominee
Member (Ex-Officio)
Ex-Officio Joint Secretary (Admin)
DBT, New Delhi or his nominee

Shri M.K. Gupta
(Member)
Ex-Engineer (Civil)
IUAC
Nominees of PMC of
Architect Special Invites

Director, ICGEB, New Delhi
Member (Ex-Officio)
ICGEB, New Delhi

Director, RCB, Faridabad
Member (Ex-Officio)
Ex-Officio Executive Director
Regional Centre for Biotechnology
Faridabad

Director (Finance), DBT, New Delhi
Member (Ex-Officio)
Ex-Officio Director (Finance)
DBT, New Delhi

DBT Scientific Co-ordinator/
Nodal Offcer for NII
Ex-Officio DBT
Scientific Co-ordinator/
Nodal Officer for NII

Senior Manager, NII, New Delhi
Member Secretary (Ex-Officio)
Ex-Officio Senior Manager
National Institute of Immunology
New Delhi

ACADEMIC COMMITTEE

Dr. Amulya K. Panda
(Chairperson)
Director
National Institute of Immunology
Aruna Asaf Ali Marg, New Delhi

Prof. Rana P. Singh
School of Life Sciences
Jawaharlal Nehru University
New Delhi

Prof. Vibha Tandon
Special Centre for Molecular Medicine
School of Biotechnology
Jawaharlal Nehru University
New Delhi

Prof. Subrata Sinha
Professor & Head
Department of Biochemistry
All India Institute of Medical Sciences
New Delhi

Prof. Yogendra Singh
Department of Zoology
University of Delhi

Prof. Satish Chandra Garkoti
Rector-II
Jawaharlal Nehru University
New Delhi

Dr. Sandeep Saxena
Staff Scientist
National Institute of Immunology
Aruna Asaf Ali Marg
New Delhi

Dr. Monica Sundd
Staff Scientist
National Institute of Immunology
Aruna Asaf Ali Marg
New Delhi

Dr. Debasisa Mohanty
Academic/Student Affairs
Staff Scientist
National Institute of Immunology
Aruna Asaf Ali Marg, New Delhi

INSTITUTIONAL ANIMAL ETHICS COMMITTEE

Dr. Vineeta Bal
(Chairperson)
Visiting Faculty
National Institute of Immunology
New Delhi

Dr. Bal Gangadhar Roy
(CPCSEA Main Nominee)
EFA, Institute of Nuclear Medicine &
Applied Sciences (INMAS)
Delhi

Dr. Jyoti Yadav
(CPCSEA Link Nominee)
CSIR- Institute of Genomics and Integrative Biology
Mall Road, Delhi

Dr. Poonam Vishwakarma
(CPCSEA nominated Member)
Veterinarian, Biosafety Support Unit
New Delhi

Sh. Amit Kamboj
(CPCSEA nominated Member)
Mss – Control Medical Service Society
New Delhi

Dr. Ayub Qadri
(Member Secretary)
Staff Scientist
National Institute of Immunology
New Delhi

Dr. Subeer S. Majumdar
(Member)
Staff Scientist
National Institute of Immunology
New Delhi

Dr. Madhulika Srivastava
(Member)
Staff Scientist
National Institute of Immunology
New Delhi

Dr. P. Nagarajan
(Member)
Staff Scientist
National Institute of Immunology
New Delhi

**On deputation at NIAB, Hyderabad*

INSTITUTIONAL BIO-SAFETY COMMITTEE

Dr. Rajesh S. Gokhale
(Chairman)
Staff Scientist
National Institute of Immunology
New Delhi

Prof. Krishnamurthy Natarajan
(DBT nominee)
Jawaharlal Nehru University
New Delhi

Dr. Mohammed Faruq
Bio-safety Officer
IGIB, New Delhi

Dr. Dhiraj Kumar
International Centre for Genetics and
Engineering Biotechnology
New Delhi

Dr. Sangeeta Bhaskar
(Member)
Staff Scientist
National Institute of Immunology
New Delhi

Dr. Vinay K. Nandicoori
(Member)
Staff Scientist
National Institute of Immunology
New Delhi

Dr. Arnab Mukhopadhyay
(Member)
Staff Scientist
National Institute of Immunology
New Delhi

Dr. Prafullakumar B. Tailor
(Member)
Staff Scientist
National Institute of Immunology
New Delhi

INSTITUTIONAL HUMAN ETHICS COMMITTEE

Prof. Subrata Sinha
(Chairman)
All India Institute of Medical Sciences
New Delhi

Dr. Chitra Sarkar
(Alternate Chairperson)
All India Institute of Medical Sciences
New Delhi

Dr. Shinjini Bhatnagar
(Member)
Translational Health Science &
Technology Institute
Faridabad

Dr. Sandeep Mathur
(Member)
All India Institute of Medical Sciences
New Delhi

Dr. Goutam Bhattacharya
K & S Partners
Intellectual Property Attorneys
Gurgaon

Maj. Gen B.S. Dhillon
(VSM, Member)
201 Rose Apartments, Gurgaon

Mr. Rajinder Raina
(Member)
National Institute of Plant Genome Research
New Delhi

Dr. Rahul Pal
(Member Secretary)
Staff Scientist
National Institute of Immunology
New Delhi

STAFF OF THE INSTITUTE

(As on 31.03.2020)

SCIENTIFIC STAFF

CORE & INFRASTRUCTURE SCIENTISTS

Dr. Amulya K. Panda, Director
Dr. Rajendra P. Roy, Staff Scientist-VII
Dr. Subeer S. Majumdar, Staff Scientist-VII (on Deputation)
Dr. Rajesh S. Gokhale, Staff Scientist-VII
Dr. Pushkar Sharma, Staff Scientist-VII
Dr. Debasisa Mohanty, Staff Scientist-VII
Dr. Mohd. Ayub Qadri, Staff Scientist-VII
Dr. Rahul Pal, Staff Scientist-VII
Dr. Parmod K. Upadhyay, Staff Scientist-VII
Dr. Madhulika Srivastava, Staff Scientist-VII
Dr. Vinay K. Nandicoori, Staff Scientist-VII
Dr. Sagar Sengupta, Staff Scientist-VII
Dr. Sangeeta Bhaskar, Staff Scientist-VII
Dr. Devinder Sehgal, Staff Scientist-VII
Dr. Apurba Kumar Sau, Staff Scientist-VI
Dr. Sandeep Saxena, Staff Scientist-VI
Dr. Monica Sundd, Staff Scientist-VI
Dr. S. Gopalan Sampathkumar, Staff Scientist-VI
Dr. Sanjeev Das, Staff Scientist-VI
Dr. Bichitra K. Biswal, Staff Scientist-VI
Dr. Arnab Mukhopadhyay, Staff Scientist-VI
Dr. Prafullakumar B. Tailor, Staff Scientist-VI
Dr. Soumen Basak, Staff Scientist-VI
Dr. Agam P. Singh, Staff Scientist-V
Dr. Sarika Gupta, Staff Scientist-V
Dr. Vidya Raghunathan, Staff Scientist-V
Dr. Nimesh Gupta, Staff Scientist-IV
Dr. Aneeskumar A.G., Staff Scientist-IV
Dr. Veena S. Patil, Staff Scientist-IV
Dr. Devram S. Ghorpade, Staff Scientist-IV
Dr. Santiswarup Singha, Staff Scientist-IV
Dr. P. Nagarajan, Staff Scientist-IV
Dr. Anil Kumar, Staff Scientist-III
Dr. Ankita Varshney, Staff Scientist-III

Professors of Eminence
Dr. Chandrima Shaha
Dr. Anil Suri

Emeritus Scientists
Dr. Satish Kumar Gupta
Dr. Akhil C. Banerjea

Adjunct Faculty
Dr. J.K. Batra

INSA Senior Scientist
Dr. Lalit Garg

OTHER SCIENTIFIC STAFF

(As on 31.03.2020)

Staff Scientists-(Project)
Dr. Nirmala Jagadish
Dr. Jairam Meena

Data Entry Operator (Project)
Ms. Abhipsha Pani

Project Assistant (DE)
Ms. Amandeep

Office Assistant (Project)
Mr. Govind Singh

Project Manager
Mr. Sandip Kaushal

Lab Technician (Project)
Mr. Vivek Kumar Pandey
Ms. Naveen Kaur

Lab Assistant (Project)
Mr. Baburam Nepali

Attendant (Project)
Mr. Krishna
Mr. Mahender

DBT –RA Programme
Dr. Meetu Agarwal
Dr. Guru Prasad Sharma
Dr. Pooja Murraka

ICMR-RA
Dr. Anuradha Gupta

DST- Inspire Faculty Award
Dr. Ashima Bhaskar
Dr. Ritu Mishra
Dr. Rakesh Pandey
Dr. Sneh Lata
Dr. Sanchita Das
Dr. Anismrita Lahon
Dr. Ekjot Kaur

DST –SERB (Young Scientist)
Dr. Savita Yadav
Dr. Asif Amin
Dr. Monika Malik
Dr. Hassan Mubarak Ishqui
Dr. Ravi Kumar

DST- (WOS-A)
Dr. Sudeepa Srichandan
Dr. Viji Vijayan

ICMR-SRF
Mr. Kuldeep singh Chuhan
Ms. Meenakshi Chawla
Mr. Mohd. Kashif
Ms. Kshama Jain
Mr. Sagnik Giri
Ms. Pratima Saini
Ms. Irene Saha

CSIR-SRA
Dr. Manglesh Kumar

DHR-Young Scientist
Dr. Prabhat Upadhyay

Ramalingaswami Fellow
Dr. Tanmay Majumdar

Project Assistant
Ms. Nikhita Anand
Ms. Tabiya Qayoom Wani
Ms. Jyotsna Dandotiya
Mr. Darshan Singh
Ms. Riya Khilwani

Research Associates
Dr. Ruchi Sachdeva Dulani
Dr. Shaista Amin
Dr. Ranjana Maurya
Dr. Soumya Kusumakshi
Dr. Debarchana Saha
Dr. Sonali Srivastava
Dr. Priyanka Bansal
Dr. Pawan Kumar
Dr. Tarun Kumar Barbhuyan
Dr. Seenu Haridas
Dr. Roseleen Ekka
Dr. Asha Shelly
Dr. Himanshi Tanwar
Dr. Abhisek Dwivedy
Dr. Saima
Dr. Mehak Zahoor Khan
Dr. Piyush Chaudhary
Dr. Ankita Malik
Dr. Swati Priya

Senior Research Fellows
Mr. Rajesh Kumar Sarkar
Ms. Neetu Gusain
Ms. Sudeepa Srichandan
Ms. Mehak Zahoor Khan
Mr. Inderjeet
Ms. Suman Gupta
Mr. Diwakar Rathour
Ms. Shagun Shukla
Ms. Sana Ismaeel
Mr. Amit Garg
Ms. Tasneem Kausar
Ms. Farhad Bano
Mr. Vinod Kumar Meena
Ms. Anita Goyala
Ms. Jyoti Singh

Junior Research Fellows (Project)
Ms. Tanaya Saha
Mr. Somdeb Chattopadhyay
Ms. Shabih Fatema
Ms. Nidhi O.
Ms. Raj Nandani
Ms. Nishu
Mr. Bhupendra S. Rawat
Ms. Snehal Bhatia
Ms. Meghna Chakraborty
Ms. Indu Sharma
Ms. M. Abaranjitha
Ms. Aprajita Tripathi
Ms. Manisha Kochar
Ms. Bharti Sharma
Mr. Belal Ahmad
Ms. Harsha Sharma
Ms. Nahid Rehman
Ms. Ritika Verma
Ms. Nidhi Solanki
Mr. Prateek Rajpara
Mr. Uddalok Jana
Mr. Aashish P. S. Chauham

PH.D SCHOLARS

Mr. Deepak
Mr. Md Qudratullah
Sh. Sagnik Giri
Ms. Sujata Kumari
Mr. Ajay Kumar
Ms. Ankita Dabla
Mr. Avinash Kumar Singh
Mr. Faizan Uddin
Mr. Kuldeep Singh Chauhan
Ms. Parul Sahu
Mr. Priyank Singhvi
Mr. Suresh Kumar
Mr. Virendra Kumar Patel
Mr. Amit Garg
Mr. Amandeep Vats
Mr. Bhupendra Singh Rawat
Mr. Deepak Kumar
Mr. Inderjeet
Ms. Kshama Jain
Mr. Manoj Kumar Rajak
Ms. Meenakshi Chawla
Mr. Mohammad Kashif
Ms. Pratima Saini
Mr. Priyesh Prateek Agrawal
Ms. Sana Ismaeel
Ms. Shagun Shukla
Ms. Shalini Verma
Ms. Shikha Salhotra
Mr. Vinod Kumar Meena
Mr. Amir Khan
Ms. Ahana Addhya
Ms. Anam Ashraf
Ms. Anurag Kalia
Ms. Ayushi Jain
Mr. Bhushan Dilip Dhamale
Ms. Gagandeep Kaur
Ms. Garima
Mr. Gautam Chandra Sarkar
Ms. Hema Sori
Mr. Irshad
Mr. Lalit Pal
Ms. Madhu Baghel
Ms. Mamta
Ms. Monika Chauhan
Ms. Monika Yadav
Ms. Prakriti Sinha
Ms. Shalakha Sharma
Ms. Sowmiya Gupta
Mr. Vipin Kumar
Ms. Yashika Ratra
Ms. Annesa Das
Ms. Alka Gupta
Ms. Anam Tasneem
Mr. Biplab Singha
Ms. Ditsa Sarkar
Ms. Indu
Ms. Moumita Sarkar
Ms. Madhurima Ghosh
Ms. Priya Gupta
Mr. Parminder Singh
Ms. Priyanka
Mr. Rahul Singh Rawat
Mr. Rahul Ahuja
Mr. Sayan Chakraborty
Ms. Shagufta Jahan
Ms. Shilpa Sachan
Mr. Sumit Murmu
Ms. Tripti Nair
Mr. Uday Aditya Sarkar
Mr. Vijay Kumar
Mr. Amit Kumar Sahu
Ms. Anamica Das
Mr. Anush Chkraborty
Mr. Asgar Ansari
Ms. Charu
Mr. Gagan Dev
Ms. Gargi Roy
Ms. Jhuhi Verma
Ms. Jyotsna
Ms. K. Varsha Mohan
Ms. Kamble Kajal Gangaram
Ms. Khushboo Jayesh Sikligar
Mr. Manti Kumar Saha
Mr. Mohammed Ahmed
Ms. Monika Mittal
Ms. Ramya Venkataraman
Mr. Sachin Kushwaha
Ms. Sana Amir
Ms. Sidra Khan
Ms. Sonika Bhatnagar
Ms. Akanksha Rawat
Ms. Alvina Deka
Mr. Akshay Khanduja
Mr. Bhushan Sanjay Nikam
Mr. Binayak Sarkar
Ms. Divya Rashmi
Ms. Monika Singh
Ms. Neha
Ms. Pooja
Ms. Purna Majumdar
Ms. Rashima Prem
Ms. Ritu Agrawal
Ms. Rohini Tamang
Mr. Satish Tiwari
Ms. Tanya Jain
Ms. Umanshi Rautela
Ms. Nilakhe Aishwarya Shrikant
Mr. Abhiraj R
Mr. Aftab Mohammed
Ms. Ankita Pal
Ms. Antara Mondal
Mr. Biswajit Ghosh
Ms. Chandrima Bharadwaj
Mr. Chen Chongtham
Ms. Deepsikha Kar
Ms. Anjali Kalia
Ms. Shivani Karalia
Ms. Komal
Mr. Mohit Yadav
Mr. Naveen Kumar
Ms. Priyadarshini Sanyal
Ms. Rashmi Sanjay Bhosale
Mr. Raunak Kar
Ms. Rimpy Arun
Ms. Sabnam Sahin Rahman
Ms. Sapna Pal
Ms. Shabnam
Ms. Shreya Bhattacharya
Mr. Someshwar Nath Jha
Mr. Soumya Banerjee
Ms. Witty Tyagi
Ms. Ankita Yadav
Ms. Yogita Kapoor

TECHNICAL STAFF

Senior Technical Officers
Mr. Ajay Kumar
Ms. Archana Ranjan
Ms. Rekha Rani
Dr. Surender Singh
Ms. Sushma Nagpal
Ms. Sweety Batra
Mr. G.S. Neelaram
Ms. Neerja Wadhwa
Mr. H.S. Sarna

Technical Officers II
Mr. Adner Bobin
Mr. Ashok Kumar
Mr. Birender Kumar
Mr. Chanderdeep Roy
Mr. Daya Nand
Mr. Dhram Vir Singh
Mr. Inderjit Singh
Mr. Kapoor Chand
Mr. Kevla Nand
Mr. Krishan Pal
Ms. Neetu Kunj
Mr. Radhey Shyam
Mr. Rajit Ram
Mr. Ram Bodh Maurya
Mr. Ramesh Chand
Mr. Ramesh Kumar
Mr. Ranbir Singh
Mr. Roshan Lal
Mr. Sunder Singh Bisht
Mr. Desh Raj
Mr. Jagdish
Mr. K.P. Pandey
Mr. Khim Singh
Mr. Kumod Kumar
Mr. Kunwar Singh
Mr. Mahesh Roy
Mr. Manoj Kumar
Mr. Mijan Khan
Mr. Nihal Singh
Mr. Pritam Chand
Mr. Mohd. Aslam

Technical Officers I
Mr. Sudipta Das
Mr. Raghav Ram
Ms. Sarojini Minj
Mr. T. Khaling

Technicians I
Mr. Ajay Bansal
Mr. Vijendra Kumar
Mr. Kiran Pal
Mr. Nand Lal Arya
Mr. Rakesh Kumar

Technicians II
Mr. Raj Kumar Peddipaga
Mr. Babu Lal Meena
Mr. Shahnawaz Haider
Mr. Birender Roy
Mr. Rajesh Meena
Mr. Anand P. Toppo
Mr. Naresh Kumar
Mr. Vineet Singh
Mr. Surinder Singh Rawat
Mr. Sonu Gupta
Mr. Arun Lal
Ms. Shipra Sankla

Skilled Work Assistants
Mr. Amar Nath Prasad
Mr. Bhan Singh
Mr. Chatter Singh
Mr. Krishan
Mr. Jawahar Singh
Mr. Rakesh Kumar II
Mr. Raj Kumar
Mr. Ram C. Singh Rawat
Mr. Vijay Pal

SUPPORT STAFF

ACADEMIC CELL

Administrative Officer
Mr. Madan Mohan

Section Officer
Ms. Sanju Bisht

Skilled Work Assistant
Ms. Rupinder Kaur

COMPUTER & BIOSTATISTICS

Senior Technical Officer
Mr. M. S. V. V .S. Rao
Ms. Sunita Sachdev

Technical Officer II
Mr. Naveen Chander

ENGINEERING & MAINTENANCE/ INSTRUMENTATION

Executive Engineers
Mr. Harendra Singh
Mr. Raj Kamal Singh

Senior Technical Officer
Mr. Mukesh Chander

Assistant Engineers
Mr. Yogesh Kumar Tripathi
Mr. Tarsem Singh
Mr. Amar Nath Sah
Mr. Netra Pal Singh
Mr. R.K. Bhardwaj
Mr. R.K. Saini
Mr. R.K. Sharma
Mr. Puran Singh Bangari
Mr. Iswari Prasad Sharma
Mr. Vinod Kumar Panchal
Mr. Sooraj Prakash
Mr. Mahabeer S. Panwar
Mr. Rambir Singh

Management Assistant
Mr. Mohan S. Negi

Junior Assistant I
Mr. Darban Singh Rawat

Technicians II
Mr. Akshya Kumar Behera
Mr. Deen Mohd
Mr. Sharwan Kumar
Mr. Rajiv Kumar
Mr. Brahm Dev

Skilled Work Assistants
Mr. Hukum Singh
Mr. Krishna P. Gaudel
Mr. Surender Kumar Kalra
Mr. Prabhu Dayal
Mr. Ram Prasad

LIBRARY & DOCUMENTATION SERVICES

Documentation Officer
Ms. Prachi S. Deshpande

Technical Officers II
Ms. Meenakshi
Mr. Ranjiv Mahajan

Technical Officer II (Documentation)
Mr. Phunglianpau

Technical Officer I
Mr. Satish K. Sharma

Technician II
Mr. Babu Lal

PRIMATE RESEARCH CENTRE

Technical Officers II
Mr. J. P. Bhardwaj
Mr. Rajinder K. Thapa
Mr. Rajesh Kumar

Skilled Work Assistant
Mr. Shambhu Kumar Bhagat

SMALL ANIMAL FACILITY

Technical Officers II
Mr. B.S. Rawat
Mr. Jarnail Singh
Mr. Sadhu Ram
Mr. Shailendra K. Arindkar
Mr. Surender Singh
Mr. Mohan K. Mandal
Mr. Dinesg CPS Negi

Technician I
Mr. Hira Singh
Mr. Subhash Chand Dogra

Technicians II
Mr. Jaglal Thakur
Mr. Mukesh Kumar
Mr. Yash Pal Singh
Mr. Suraj Kumar

Skilled Work Assistants
Mr. Kuldeep Kumar
Mr. Nand Kishore
Mr. Prem Chand
Mr. Ram Bhool
Mr. Ram Dev Yadav
Mr. Ram Surat
Mr. Subhash Chand III

ADMINISTRATIVE STAFF

GENERAL ADMINISTRATION

Senior Manager
Lt. Col. (Dr.) D. K. Vashist

Manager (A&E)
Ms. Anju Sarkar

Administrative Officers
Ms. Chandresh Bhagtani
Mr. Ranbir Singh

Section Officers
Ms. Sheela Satija
Ms. Daisy Sapra

Accounts Offier
Mr. Dev Dutt Sharma

Management Assistants
Mr. A.K. Dey
Mr. Sant Lal
Mr. Dharambir
Mr. Siddharth Sharma

Junior Translator
Ms. Nisha

Junior Assistant I
Mr. Alam Singh
Mr. Mohan Lal

Drivers
Mr. Madan Lal
Mr. Mahender Singh
Mr. Satyabir Singh
Mr. Suti Prakash

Technician II
Mr. Puran Singh

Skilled Work Assistants
Mr. Dinesh Singh
Mr. Nand Lal Malakar
Mr. Rajeev Kumar
Mr. Ajay Kumar

FINANCE & ACCOUNTS

Finance & Accounts Officer
Mr. Padam Singh Rawat

Administrative Officer
Mr. Pradeep Chawla

Section Officer
Mr. Suresh C. Chandel

Management Assistant
Mr. Om Prakash

Skilled Work Assistant
Mr. Naveen Negi

STORES & PURCHASE

Section Officers
Mr. Mahender Pal Singh
Mr. Rakesh Satija
Mr. Aslam Ali

Management Assistant
Mr. Than Singh

Junior Assistant I
Mr. Debarshi Deb

Junior Assitant II
Mr. Balraj

BUDGET, FINANCE, AUDITOR'S REPORT AND AUDITED ACCOUNTS

BUDGET & FINANCE FOR FY 2019-20

SOURCES OF FUNDS

The financial resources of the Institute are the core grants provided by the Government of India, Department of Biotechnology, against annual budgetary projections made by the Institute, and other resources in the form of research grants provided by various National and International agencies. The components of the core grants are under Recurring head for meeting the expenditure on salaries and operating expenses and under Non-Recurring head for meeting expenses on account of equipments, infrastructure, building costs connected with Institute activities.

RECEIPTS

The total receipts during the year including opening balances were Rs. 13901.63 lakhs as given in **Diagram-1 & 2** and details of receipt as per below **Table - 1:**

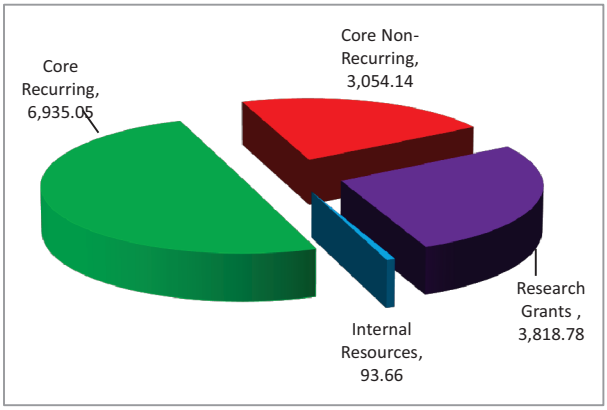


Diagram-1

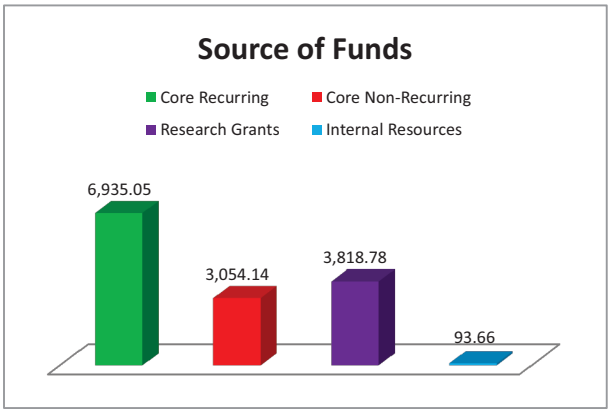


Diagram-2

Table - 1

A: Core Funds provided by Government of India, Department of Biotechnology

(₹ In Lakhs)

	Opening Balance	Receipts During The Year FY 2019-20	Total Fund	% of Fund
I - Recurring	745.05	6,190.00	6,935.05	49.89%
II - Non - Recurring	1,000.14	2,054.00	3,054.14	21.97%
Total			**9,989.19**	**71.86%**

B: Research Projects sponsored by the National and International agencies				
National and International Agencies	1,056.06	2,762.72	3,818.78	27.47%
Total			**3,818.78**	**27.47%**

C: Internal resources generated				
Core	Nil	93.66	93.66	0.67%
Others	Nil	Nil	Nil	Nil
Total			**93.66**	**0.67%**
Grand Total (A+B+C)			**13,901.63**	**100.00%**

APPLICATION OF FUNDS

The total expenditure of research activities, infrastructure development during the year as given in **Diagram – 3 & 4** and details of expenditure as per **Table - 2.**

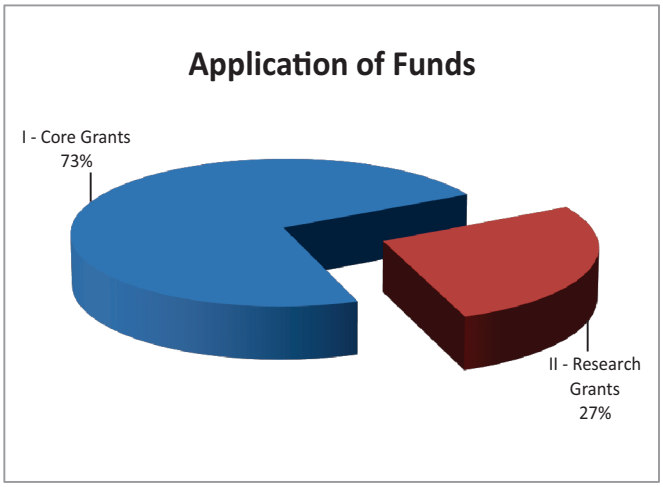


Diagram-3

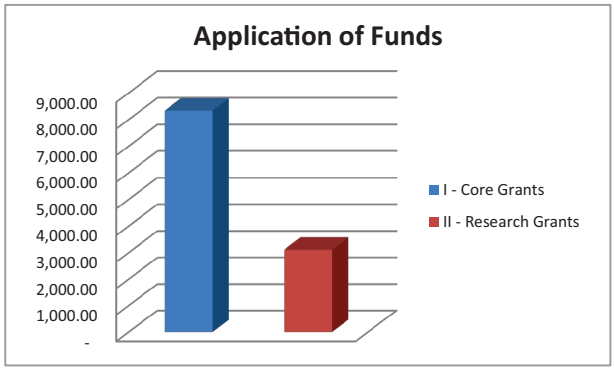


Diagram-4

Table - 2 *(₹ In Lakhs)*

Application of Funds		
Share of funds in overall expenditure	**Expenditure Amount**	**% of Fund**
I - Core Grants	8,331.38	72.84%
II - Research Grants	3,106.39	27.16%
Total	**11,437.77**	**100.00%**

OVERALL EXPENDITURE AT A GLANCE

Overall details of expenditure for the financial year as given in **Table – 3** and **Diagram – 5 & 6**

Table - 3 *(₹ In Lakhs)*

Expenditure Head	Amount	% Age
I - Recurring		
Salaries and wages	3,796.35	33.19%
Operating costs viz, chemical, Consumable, animal diet, electricity, Water, stationary, transport etc.	5,580.00	48.79%
Total	**9,376.35**	**81.98%**
II - Non - Recurring		
Infrastructure facilities/flats/land	Nil	Nil
Equipment/Furniture/Vehicle (including margin money)	2061.42	18.02%
TOTAL	**2061.42**	**18.02%**
Grand Total	**11,437.77**	**100.00%**

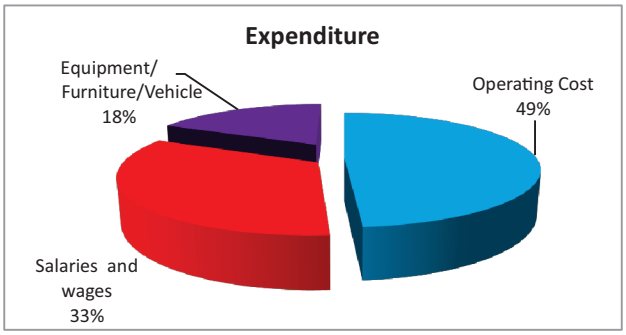


Diagram-5

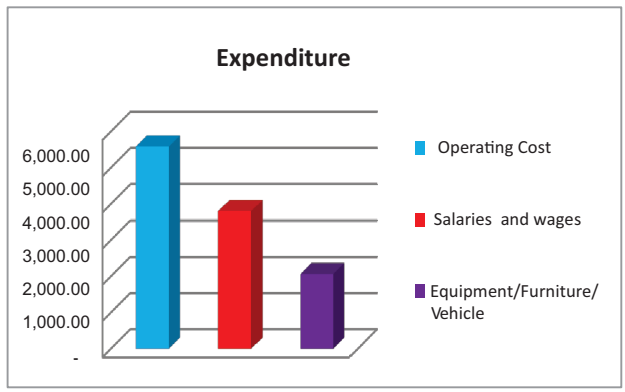


Diagram-6

BUDGETARY PROJECTIONS, SANCTIONS AND EXPENDITURE OVERVIEW

The Governing Body of the Institute approved the budget estimates for the financial year 2019-20 as under:

Plan (Recurring & Non Recurring)	Rs. 7,790 Lakhs
Total	**Rs. 7,790 Lakhs**

The Revised Estimates for the financial year 2019-20 were approved by the Governing Body Rs 12000.90 lakhs against which DBT has released Rs 8,244.00 lakhs.

The Institute has prepared its account on accrual basis, the closing balance of Rs. 1751.47 lakhs shown above has been carried forward to the next financial year 2020-21.

The budgetary requirements projected to the Government are the need after taking into account the funds which are made available against various national and International grants. Also these provide for the capital equipment needed for specific research against the grants.

MAHESHWARI PA & ASSOCIATES
Chartered Accountants

1st Floor, Saraswati Plaza, E.K. Road, Meerut
Ph: 0121-4059052, 4059065, +91-7217000890, 9997179121,
Email : maheshwarica9@gmail.com

INDEPENDENT AUDITOR'S REPORT

Report on the Financial Statements

1. We have audited the accompanying financial statements of **M/S NATIONAL INSTITUTE OF IMMUNOLOGY** ("the Institute"), which comprise the Balance Sheet as at March 31, 2020, the Statement of Income & Expenditure A/c for the year then ended, and a summary of the significant accounting policies and other explanatory information, which we have signed under reference to this report.

Management's Responsibility for the Financial Statements

2. The Institute's Management is responsible for the matters with respect to the preparation of these financial statements that give a true and fair view of the financial position and financial performance of the Institute in accordance with the accounting principles generally accepted in India, including the Accounting Standards specified. This responsibility also includes the maintenance of adequate accounting records for safeguarding of the assets of the Institute and for preventing and detecting the frauds and other irregularities; selection and application of appropriate accounting policies; making judgments and estimates that are reasonable and prudent; and design, implementation and maintenance of internal financial control, that were operating effectively for ensuring the accuracy and completeness of the accounting records, relevant to the preparation and presentation of the financial statements that give a true and fair view and are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

3. Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with the Standards on Auditing issued by the Institute of Chartered Accountants of India and in accordance with the Standards on Auditing specified. Those Standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

4. An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments,

206, 1st Floor, Vikas Complex, Opp. Metro Pilar No. 57,37,
Veer Savarkar Block, Nirman Vihar, New Delhi-92

the auditor considers internal control relevant to the Institute's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Institute's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of the accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

5. We believe that the Audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

6. In our opinion and to the best of our information and according to the explanations given to us, the aforesaid financial statements give the information , in the manner so required and give a true and fair view in conformity with the accounting principles generally accepted in India:

a) In the case of the Balance Sheet, of the state of affairs of the Institute as at March 31, 2020;

b) In the case of the Statement of Income & Expenditure A/c of the Institute for the year ended on that date.

7. *Report on Other Legal and Regulatory Requirements*

1) As required, we report that:

a) We have obtained all the information and explanations which to the best of our knowledge and belief were necessary for the purpose of our audit;

b) In our opinion, proper books of account as required by law have been kept by the Institute so far as it appears from our examination of those books;

c) The Balance Sheet and Statement of Income & Expenditure A/c dealt with by this Report are in agreement with the books of account;

d) In our opinion, the Balance Sheet, Statement of Income & Expenditure A/c, Receipt & Payment A/c comply with the Accounting Standards;

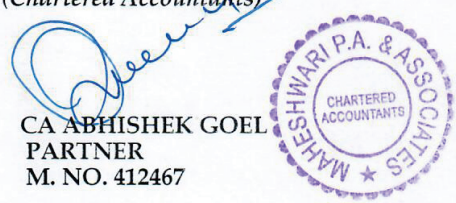
e) In our opinion and to the best of our information and according to the explanations given to us, we report as under with respect to other matters to be included in the Auditor's Report:

i) The Institute does not have any pending litigations which would impact its financial position, except four cases which are pending.

ii) The Institute did not have any long term contracts including derivative contracts; as such the question of commenting on any material foreseeable losses thereon does not arise.

iii) Approx 45 Projects were found nonworking since last 5 years or more than that with a debit balance of Rs. 1,81,44,347.30 which had not been received also a debit balance of Rs. 35,89,686.00 was found against 13 projects which came to end two financial years ago.

FOR MAHESHWARI P A AND ASSOCIATES
(Chartered Accountants)



CA ABHISHEK GOEL
PARTNER
M. NO. 412467

Date: 11th September, 2020
Place: New Delhi
UDIN : **20412467AAAAEK4505**

NATIONAL INSTITUTE OF IMMUNOLOGY
Aruna Asaf Ali Marg , New Delhi
BALANCE SHEET AS AT 31st MARCH 2020

	Schedule	Current Year	Previous Year
CORPUS / CAPITAL FUND AND LIABILITIES		Amount in (₹)	
Corpus/Capital Fund	1	97,25,27,765	83,34,05,846
Reserves and Surplus	2	7,81,24,032	11,75,64,164
Earmarked/Endowment Funds	3	72,86,54,370	70,23,99,075
Current Liabilities and Provisions	4	9,42,61,876	6,99,07,310
Total (Liabilities)		**1,87,35,68,043**	**1,72,32,76,395**
ASSETS			
Fixed Assets	5	84,77,69,731	74,87,15,784
Investments - From Earmarked/Endowment Funds	6	1,74,03,333	1,74,03,333
Current Assets, Loans, Advances, etc.	7	1,00,83,94,979	95,71,57,278
Miscellaneous Expenditure (to the extent not written off or adjusted		-	-
Total (Assets)		**1,87,35,68,043**	**1,72,32,76,395**
Significant Accounting Policies & notes on accounts	17		

As per our separate report
of even date attached

For MAHESHWARI P A & ASSOCIATES
Chartered Accountants
(FRN-012023C)

MAHESHWARI P.A. & ASSOCIATES ★ CHARTERED ACCOUNTANTS

(ABHISHEK GOEL)
PARTNER

M.No. 412467
Dated: 11th September, 2020

Singnature for NATIONAL INSTITUTE OF IMMUNOLOGY

NATIONAL INSTITUTE OF IMMUNOLOGY ★ NEW DELHI-67 ★

(Dr. AMULYA KUMAR PANDA)
DIRECTOR

(P S RAWAT)
F & A O

NATIONAL INSTITUTE OF IMMUNOLOGY

Aruna Asaf Ali Marg , New Delhi

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31st MARCH 2020

	Schedule	Current Year	Previous Year
INCOME		Amount in (₹)	
Grants/ Subsidies	8	61,90,00,000	59,00,00,000
Fees/Subscriptions	9	20,99,504	22,50,000
Income from Investments	10	-	30
Income from Royalty, Publications	11	2,03,000	-
Interest Earned	12	-	-
Other Income	13	70,63,260	1,10,95,333
Deferred Revenue- Depreciation	5	10,70,88,096	9,87,63,670
Total Income (A)		**73,54,53,860**	**70,21,09,033**
EXPENDITURE			
Establishment Expenses	14	31,71,14,699	30,60,46,106
Other Administrative/Lab Expenses etc.	15	35,06,91,197	31,31,08,398
Expenditure on Grants, Subsidies etc.	16	-	-
Depreciation (Net Total at the year-end - Corresponding to schedule 8)	5	10,70,88,096	9,87,63,670
Total Expenditure (B)		**77,48,93,992**	**71,79,18,174**
Balance being excess of Income over Expenditure Before Prior Period Item (A-B)			-
Balance being excess of Expenditure over Income Before Prior Period Item (B-A)		**3,94,40,132**	**1,58,09,141**
Prior Period Item		-	
Balance being excess of Expenditure over Income After Prior Period Item		**3,94,40,132**	**1,58,09,141**
Balance being excess of Income Expenditure over After Prior Period Item		-	-
Transfer to Special Reserves (Specify Each)			
Transfer to / from General Reserve			
Balance being Surplus/(Deficit) carried to Corpus/Capital Fund			
Significant Accounting Policies & notes on accounts	17		

As per our separate report
of even date attached

For MAHESHWARI P.A. & ASSOCIATES
Chartered Accountants
(FRN-0120230)

(ABHISHEK GOEL)
PARTNER

M.No. 412467
Dated: 11th September, 2020

MAHESHWARI P.A. & ASSOCIATES ★ CHARTERED ACCOUNTANTS

Singature for NATIONAL INSTITUTE OF IMMUNOLOGY

(Dr. AMULYA KUMAR PANDA)
DIRECTOR

NATIONAL INSTITUTE OF IMMUNOLOGY ★ NEW DELHI-67 ★

(P S RAWAT)
F & AO

NATIONAL INSTITUTE OF IMMUNOLOGY
Aruna Asaf Ali Marg, New Delhi
RECEIPTS AND PAYMENTS ACCOUNT FOR THE YEAR ENDED 31st March 2020

RECEIPTS	Current Year	Previous Year	PAYMENTS	Current Year	Previous Year
	Amount in (₹)			Amount in (₹)	
Opening Balances			**Expenditure of Fixed Asstts & Capital Work-in-Progress**		
Cash in Hand	20,000	20,000	Purchase of Fixed Assets	16,53,32,028	7,18,63,548
Bank Balances					
In current account	-	4,10,324	**Grants Refund From Government of India**		
Saving accounts	13,48,20,491	26,57,29,206	Recurring	-	-
Imprest Account			Non Recurring	-	-
Grants Received					
From Government of India			**Direct (Establishment) Expenses**		
Recurring	61,90,00,000	59,00,00,000	Salaries and Wages and allowances	27,59,69,119	24,87,41,191
Non Recurring	20,54,00,000	14,50,00,000	Bonus	-	-
Grants/Donations (Project)	27,62,71,548	15,55,01,689	Contribution to CPF	1,42,53,596	2,54,43,119
			Contribution to NSP	59,59,103	51,75,296
Interest Received			Contribution to Gratuity Fund	51,99,135	76,51,446
Interest on Fixed Deposit	1,84,82,044	93,06,152	Staff Welfare Expenses	3,01,084	1,51,225
On Bank SB A/c	4,85,402	98,04,439	Exp on Employes' Retirement &Terminal Benefits	30,40,765	71,13,228
Loans, Advances etc.	1,54,591	2,58,400	Medical Expenses	1,08,24,393	93,12,701
			Liveries & Uniforms	1,65,200	3,17,147
Decrease in Current Assets			Leave Encashment	14,02,304	21,40,753
Advance to supplier	-	-			
Advance to Staff	-	68,300	**Indirect Expenses**		
Grants Recievable	8,17,958		Other Administrative & Lab Expenses	35,06,91,197	31,31,08,398
Security & other Deposits	-	-	Interest refunded to DBT	1,91,22,037	1,93,68,991
Claims Receivable	1,819	-			
TDS Receivable	-	-	**Increase in Current Assets**		
Prepaid Expenses	-	-	Advance to supplier	1,10,07,167	1,53,303
Income Accrued	-	48,278	Advance to Staff	4,99,630	-
			Grants Recievable	-	1,64,151
Increase in Current Liabilities			Security & other Deposits	-	-
Sundry Creditors	87,67,160	1,10,19,397	Claims Receivable	-	70,653
Statutory Liabilities	-	34,40,647	TDS Receivable	9,522	1,81,330
Other Deposit	-	-	Prepaid Expenses	11,74,214	29,05,643
Payable to Staff	12,19,410	-			
Payable to Other Agency	42,94,271	1,51,17,101	**Decrease in Current Liabilities**		
Security Deposit-EMD	1,10,27,036		Sundry Creditors		
Expenses Payable	1,52,333	-	Statutory Liabilities	10,04,412	-
With Held Amount	-	23,90,842	Other Deposit	-	-
			Payable to Staff	-	1,11,39,452
Other Income	-		Payable to Other Agency	-	-
PHD Admisssion Fees	20,99,504	22,50,000	Security Deposit-EMD	-	1,01,47,632
Income from Consultancy	2,03,000	-	Expenses Payable	-	60,842
Sale of Scrap	7,44,689	83,295	Stale Cheque	1,232	52,570
Fees for Miscellaneous Services	12,500	-	With Held Amount	1,00,000	-
Demurrage Charges	79,792	-			
Guest House Charges	7,54,680	8,25,093	**Earmarked and Endowment Funds**		
Misc. Income	3,39,397	1,98,970	**Payments**		
Overhead	43,70,664	48,04,101	Capital Expenditure	4,08,10,015	1,51,31,658
Tender Fees	1,54,000	1,95,500	Revenue Expenditure	22,62,87,878	11,55,23,285
Contingency	4,72,038	2,43,974	Refund of Grants	4,35,41,087	67,99,249
Utility Charges	1,35,500	79,500			
Balance Written Back	-	46,64,900	**Investment**		
Lease Charges	-	30	Investment-From Earmarked/Endowment Funds	2,52,25,151	7,25,00,000
			Fixed Deposit including Margin Money	99,68,232	22,01,71,817
Earmarked and Endowment Funds					
Payments			**Closing Balances**		
Income from Investments of Funds	4,26,00,723	3,48,76,456	Cash in Hand	63,000	20,000
Other Income/Addtions	1,10,000	5,94,955	Bank Balance		
Advances for Expenses	-	39,22,912	Current Accounts	-	-
Employees Fund	1,79,12,004	3,93,74,658	Saving Accounts	13,89,51,053	13,48,20,491
TOTAL	**1,35,09,02,554**	**1,30,02,29,119**	**TOTAL**	**1,35,09,02,554**	**1,30,02,29,119**

As per our separate report
of even date attached

For MAHESHWARI P A & ASSOCIATES
Chartered Accountants
(FRN-012023C)

(ABHISHEK GOEL)
PARTNER

M.No. 412467
Dated: 11th September, 2020

MAHESHWARI P.A. & ASSOCIATES CHARTERED ACCOUNTANTS

Signatures for NATIONAL INSTITUTE OF IMMUNOLOGY

(Dr. AMULYA KUMAR PANDA)
DIRECTOR

(P S RAWAT)
F & AO

NATIONAL INSTITUTE OF IMMUNOLOGY NEW DELHI-67

NATIONAL INSTITUTE OF IMMUNOLOGY, Aruna Asaf Ali Marg , New Delhi
SCHEDULE FORMING PART OF BALANCE SHEET AS AT 31st MARCH 2020

SCHEDULE-1 : CORPUS/CAPITAL FUND

	Amount in (₹)			
	Current Year		Previous Year	
Corpus Fund				
Balance as at the beginning of the year		14,90,02,119		7,58,65,667
Add: Contribution towards Corpus/Capital Fund				
NII Core-Plan(Non-Recurring)	20,54,00,000		14,50,00,000	
Capitlised Portion of Fixed Assests of Projects	4,08,10,015	24,62,10,015	1,51,31,658	16,01,31,658
Add/(Deduct): Balance of net income/(expenditure) transferred from the Income and Expenditure Account	-		-	
Add: Sale/Adjustment of fixed assets	-	-	44,400	44,400
Less: Trf to Fixed Assets Fund	20,61,42,043		8,70,39,606	
Add: Trf From Capital Reserve	-	20,61,42,043	-	8,70,39,606
		18,90,70,091		**14,90,02,119**
Fixed Assets Fund				
Balance as at the beginning of the year	62,96,72,541		64,37,30,792	
Add: Transfer from Corpus Fund	-		-	
Add: Assets purchased during the year	16,53,32,028		7,19,07,948	
Less: Assets Transferred	-		44,400	
Less: Deferred Revenue Depreciation	9,17,02,063	70,33,02,506	8,59,21,799	62,96,72,541
Fixed Assets Fund (Project)				
Balance as at the beginning of the year	5,47,31,186		5,24,41,399	
Add:Assets purchased during the year	4,08,10,015		1,51,31,658	
Less: Assets Transferred	-		-	
Less: Deferred Revenue Depreciation	1,53,86,033	8,01,55,168	1,28,41,871	5,47,31,186
TOTAL		**97,25,27,765**		**83,34,05,846**

MAHESHWARI P.A. & ASSOCIATES ★ CHARTERED ACCOUNTANTS

NATIONAL INSTITUTE OF IMMUNOLOGY ★ NEW DELHI-67 ★

NATIONAL INSTITUTE OF IMMUNOLOGY, Aruna Asaf Ali Marg , New Delhi
SCHEDULE FORMING PART OF BALANCE SHEET AS AT 31st MARCH 2020

SCHEDULE-2 : RESERVES AND SURPLUS

	Amount in (₹)			
	Current Year		Previous Year	
1 Capital Reserve				
As per last Account	6,55,45,583		6,55,45,583	
Addition during the Year	-		-	
Less Deductions during the year	-	6,55,45,583	-	6,55,45,583
2 General Reserve				
As per last Account	5,20,18,581		6,78,27,722	
Addition during the Year				
Less : Deductions during the year	3,94,40,132	1,25,78,449	1,58,09,141	5,20,18,581
Balance as at the year end		**7,81,24,032**		**11,75,64,164**

MAHESHWARI P.A. & ASSOCIATES CHARTERED ACCOUNTANTS

NATIONAL INSTITUTE OF IMMUNOLOGY * NEW DELHI-67

NATIONAL INSTITUTE OF IMMUNOLOGY, Aruna Asaf Ali Marg , New Delhi
SCHEDULE FORMING PART OF BALANCE SHEET AS AT 31st MARCH 2020

SCHEDULE-3 : EARMARKED/ENDOWMENT FUNDS

	Amount in (₹)			
	Current Year		Previous Year	
a) Opening Balance of the Funds	70,23,99,075	70,23,99,075	60,55,82,597	60,55,82,597
b) Additions to the Funds				
i. Donations/Grants	27,62,71,548		15,55,01,689	
ii. Income from investments made on account of Funds	4,26,00,723		3,48,76,456	
iii. Other Income/Addtions	1,10,000		5,94,955	
iv. Advances for Expenses	-		39,22,912	
v. Employees Fund	1,77,67,924	33,67,50,195	3,91,33,882	23,40,29,894
Total (a+b)		**1,03,91,49,270**		**83,96,12,490**
c) Utilization/Expenditure towards objectives of Funds				
I Capital Expenditure				
i. Fixed Assets	4,08,10,015		1,51,31,658	
	-		-	
Total		**4,08,10,015**		**1,51,31,658**
II Revenue Expenditure				
i. Salaries, Wages and allownaces, etc.	6,25,19,569		4,65,95,621	
ii. Reduction of Projects Debit Balances	8,17,958		-	
iii. Other Expenses	17,39,03,034		5,58,62,508	
Total		**23,72,40,561**		**10,24,58,129**
III Margin Money		**(1,09,52,683)**		**1,30,65,156**
IV Refund of Unutilised Grants		**4,35,41,087**		**67,99,249**
V Reduction of Loan and Advances to Employees		**(1,44,080)**		**(2,40,776)**
Total (c)		**31,04,94,900**		**13,72,13,416**
Net Balance at the year end (a + b - c)		**72,86,54,370**		**70,23,99,075**

MAHESHWARI P.A. & ASSOCIATES CHARTERED ACCOUNTANTS

NATIONAL INSTITUTE OF IMMUNOLOGY NEW DELHI-67

NATIONAL INSTITUTE OF IMMUNOLOGY, Aruna Asaf Ali Marg , New Delhi
SCHEDULE FORMING PART OF BALANCE SHEET AS AT 31st MARCH 2020

SCHEDULE-4 : CURRENT LIABILITIES AND PROVISIONS

	Amount in (₹)			
	Current Year		Previous Year	
A. CURRENT LIABILITIES				
1 Acceptances				
2 Sundry Creditors	2,62,88,469		1,75,21,309	
3 Statutory Liabilities	25,34,955		35,39,367	
4 Other Deposit	-		-	
5 Payable to Staff	59,88,406		47,68,996	
6 Payable to Other Agency	2,69,68,738		2,26,74,467	
7 Security Deposit-EMD	2,94,47,765		1,84,20,729	
8 Expenses Payable	5,25,475		3,73,142	
9 Stale Cheque	-		1,232	
10 Other Liabilities				
With Held Amount	25,08,068		26,08,068	
Loans & Advances to Staff for HBA/Conveyance				
Security Deposit - Others				
		9,42,61,876		6,99,07,310
Total (a)		**9,42,61,876**		**6,99,07,310**
B. PROVISIONS				
1 Gratuity	-		-	
2 Superannuation/Pension	-		-	
3 Accumulated Leave Encashment	-		-	
4 Trade Warranties/Claims	-		-	
5 For Expenses	-	-	-	-
Total (b)		-		-
TOTAL (a+b)		**9,42,61,876**		**6,99,07,310**

MAHESHWARI P.A. & ASSOCIATES ★ CHARTERED ACCOUNTANTS

NATIONAL INSTITUTE OF IMMUNOLOGY ★ NEW DELHI-67 ★

NATIONAL INSTITUTE OF IMMUNOLOGY, Aruna Asaf Ali Marg , New Delhi

SCHEDULE FORMING PART OF BALANCE SHEET AS AT 31st MARCH 2020

SCHEDULE-5 : FIXED ASSETS/ DEPRECIATON

	RATE OF DEPRC.	GROSS BLOCK					DEPRECIATION			NET BLOCK	
		Cost /valuation As at begining of the Year	Addition		Deductions during the Year	Cost /valuation As at end of the Year	As at begining of the Year	Depreciation for the year	Total upto the Year-end	Current year	Previous year
A. FIXED ASSETS			More than 6 Months	Less than 6 Months						Amount in (₹)	
1. LAND											
a) Freehold	0%	6,53,54,558				6,53,54,558	-	-	-	6,53,54,558	6,53,54,558
b) Leasehold	0%	-				-	-		-	-	-
2. BUILDINGS											
a) On Freehold Land	10%	56,64,01,432	-	-		56,64,01,432	30,95,10,702	2,56,89,073	33,51,99,775	23,12,01,658	25,68,90,731
b) On Leasehold Land	10%	-				-	-		-	-	-
c) Ownership Flats/Premises	10%	1,68,24,584	-	-		1,68,24,584	1,32,72,510	3,55,207	1,36,27,718	31,96,867	35,52,074
d) Project Building	10%	3,88,02,000	-	-		3,88,02,000	1,33,44,008	25,45,799	1,58,89,807	2,29,12,193	2,54,57,992
3. PLANT & MACHINERY AND EQUIPMENT							-		-	-	-
a) P&M	15%	1,47,77,47,811	1,06,09,052	14,10,51,200		1,62,94,08,063	1,21,63,64,143	5,13,77,748	1,26,77,41,891	36,16,66,173	26,13,83,669
b) Project Equipment	15%	10,44,97,160	63,16,777	3,43,64,499		14,51,78,436	4,43,77,562	1,25,42,794	5,69,20,356	8,82,58,080	6,01,19,598
c) Computer & Peripherals	40%	64,40,50,324	16,07,996	41,58,426		64,98,16,746	64,06,43,121	28,37,765	64,34,80,886	63,35,860	34,07,203
d) Project Computer	40%	20,33,262	22,739	1,06,000		21,62,001	14,88,791	2,48,084	17,36,875	4,25,126	5,44,471
e) Software	40%	2,00,77,352	4,48,642	9,44,108		2,14,70,102	1,90,63,428	7,73,848	1,98,37,276	16,32,826	10,13,924
f) Project Software	40%	12,60,892	-	-		12,60,892	11,37,503	49,356	11,86,858	74,034	1,23,389
g) Books & Periodicals	40%	6,07,338	28,016	-		6,35,354	5,01,025	53,732	5,54,756	80,598	1,06,313
4. VEHICLES	15%	73,76,944	20,00,888	-		93,77,832	53,22,003	6,08,374	59,30,378	34,47,454	20,54,940
5. FURNITURE & FIXTURES	10%	5,59,02,916	16,52,201	17,71,334		5,93,26,451	4,28,96,691	15,54,409	4,44,51,100	1,48,75,351	1,30,06,225
6. ELECTRICAL INSTLATIONS	15%	4,76,73,790	-	-		4,76,73,790	4,29,43,823	7,09,495	4,36,53,318	40,20,471	47,29,966
7. LIBRARY BOOKS	40%	1,49,29,276	-	-		1,49,29,276	1,49,24,203	2,029	1,49,26,232	3,043	5,072
8. TUBWELLS & WATER SUPPLY	15%	-	-	-		-	-	-	-	-	-
9. OTHER FIXED ASSETS							-		-	-	-
a) DG Set	15%	5,65,02,846	-	-		5,65,02,846	3,39,77,995	33,78,728	3,73,56,723	1,91,46,123	2,25,24,850
b) A/c plant and air cooling system	15%	6,46,08,919	2,13,624	6,10,756		6,54,33,299	5,87,33,183	9,59,211	5,96,92,393	57,40,906	58,75,737
c) Lifts	15%	37,62,195	-	-		37,62,195	35,42,666	32,929	35,75,596	1,86,599	2,19,529
d) Animal Cages	15%	4,56,07,952	-	2,35,785		4,58,43,737	2,32,62,410	33,69,515	2,66,31,925	1,92,11,812	2,23,45,542
TOTAL (CURRENT YEAR)		3,23,40,21,551	2,28,99,935	18,32,42,108	-	3,44,01,63,594	2,48,53,05,768	10,70,88,096	2,59,23,93,864	84,77,69,731	74,87,15,784
PREVIOUS YEAR		3,14,70,26,345	4,05,46,744	4,64,92,862	44,400	3,23,40,21,551	2,38,65,42,098	9,87,63,670	2,48,53,05,768	74,87,15,784	76,04,84,247
B. CAPITAL WORK-IN-PROGRESS											
a) Capital work-in-progress including advances,construction materials and building under construction(net of recovery)		-	-	-	-	-	-	-	-	-	-
TOTAL (CURRENT YEAR)		-	-	-	-	-	-	-	-	-	-
PREVIOUS YEAR		-	-	-	-	-	-	-	-	-	-
GRAND TOTAL (A + B)		3,23,40,21,551	2,28,99,935	18,32,42,108	-	3,44,01,63,594	2,48,53,05,768	10,70,88,096	2,59,23,93,864	84,77,69,731	74,87,15,784
GRABD PREVIOUS YEAR (A + B)		3,14,70,26,345	4,05,46,744	4,64,92,862	44,400	3,23,40,21,551	2,38,65,42,098	9,87,63,670	2,48,53,05,768	74,87,15,784	76,04,84,247

MAHESHWARI P.A. & ASSOCIATES CHARTERED ACCOUNTANTS

NATIONAL INSTITUTE OF IMMUNOLOGY * NEW DELHI-67 *

NATIONAL INSTITUTE OF IMMUNOLOGY, Aruna Asaf Ali Marg , New Delhi
SCHEDULE FORMING PART OF BALANCE SHEET AS AT 31st MARCH 2020

SCHEDULE-6 : INVESTMENTS FROM EARMARKED/ ENDOWMENT FUNDS

	Amount in (₹)	
	Current Year	**Previous Year**
1 In Government Securities	-	-
2 Other approved Securities	-	-
3 Shares	-	-
4 Debentures and Bonds	-	-
5 Subsidiaries and Joint Ventures	-	-
6 Others	-	-
(i) Special Deposit Account-RBI	1,74,03,333	1,74,03,333
(ii) Fixed Deposit with Sch. Bank	-	-
TOTAL	**1,74,03,333**	**1,74,03,333**

MAHESHWARI P.A. & ASSOCIATES CHARTERED ACCOUNTANTS

NATIONAL INSTITUTE OF IMMUNOLOGY NEW DELHI-67

NATIONAL INSTITUTE OF IMMUNOLOGY, Aruna Asaf Ali Marg , New Delhi
SCHEDULE FORMING PART OF BALANCE SHEET AS AT 31st MARCH 2020
SCHEDULE-7 : CURRENT ASSETS, LOANS, ADVANCES, ETC.

	Amount in (₹)			
	Current Year		Previous Year	
A CURRENT ASSETS				
1 Cash Balances in hand (including cheques/drafts and imprest)		63,000		20,000
2 Bank Balances				
a) With Schduled Banks				
On Current Accounts	-		-	
On Deposit Accounts (includes Margin Money-Core)	26,95,27,417		27,53,74,034	
On Savings Accounts	13,89,51,053		13,48,20,491	
FD from Earnmarked and Endowment fund	54,83,40,000		50,73,00,000	
Special Deposit Account				
		95,68,18,470		91,74,94,525
Total (A)		**95,68,81,470**		**91,75,14,525**
B LOANS, ADVANCES AND OTHER ASSETS				
1 Loans				
a) Staff	-		-	
b) Other Entities engaged in activities/ objectives similar to that of the Entity	-		-	
c) Others	-		-	
Loans & Advances to Staff for HBA/Conveyance	-		-	
Security Deposit - Projects	-	-	-	-
2 Advances and other amounts receivable in cash or in kind for value to be received				
a) On Capital Account	-		-	
b) Advance to supplier	1,15,40,746		5,33,579	
c) Advance to Staff	7,32,630		2,33,000	
d) Grants Recievable	2,17,34,033		2,25,51,991	
e) Security & other Deposits	23,83,235	3,63,90,644	23,83,235	2,57,01,805
3 Income Accrued				
a) On Investments from Earmarked/ Endowment Funds	-		-	
b) On invetments - Others	-		-	
c) On Loans and Advances	-		-	
d) Others	-	-	-	-
4 Claims Receivable		30,57,476		30,59,295
5 TDS Receivable		35,19,416		35,09,894
Total (B)		**4,29,67,536**		**3,22,70,994**
C Prepaid Expenses		85,45,973		73,71,759
TOTAL (A + B + C)		**1,00,83,94,979**		**95,71,57,278**

MAHESHWARI P.A. & ASSOCIATES CHARTERED ACCOUNTANTS

NATIONAL INSTITUTE OF IMMUNOLOGY * NEW DELHI-67 *

NATIONAL INSTITUTE OF IMMUNOLOGY, Aruna Asaf Ali Marg , New Delhi
SCHEDULE FORMING PART OF INCOME AND EXPENDITURE FOR THE YEAR ENDED 31st MARCH 2020

SCHEDULE-8 : GRANTS/SUBSIDIES

Irrevocable Grants & Subsidies Received	Amount in (₹)	
	Current Year	Previous Year
1. Central Government		
Non-Plan	-	-
Plan	61,90,00,000	59,00,00,000
2. State Government(s)	-	-
3. Government Agencies	-	-
4. Institutions/Welfare Bodies	-	-
5. International Organisations	-	-
6. Others	-	-
TOTAL	**61,90,00,000**	**59,00,00,000**

MAHESHWARI P.A. & ASSOCIATES CHARTERED ACCOUNTANTS

NATIONAL INSTITUTE OF IMMUNOLOGY NEW DELHI-67

NATIONAL INSTITUTE OF IMMUNOLOGY, Aruna Asaf Ali Marg , New Delhi
SCHEDULE FORMING PART OF INCOME AND EXPENDITURE FOR THE YEAR ENDED 31st MARCH 2020

SCHEDULE-9 : FEES/SUBSCRIPTIONS

	Amount in (₹)	
	Current Year	**Previous Year**
1. Entrance Fees	20,99,504	22,50,000
2. Annual Fees/ Subscription to Journals	-	-
3. Seminar/Program Fees	-	-
4. Consultancy Fees	-	-
5. Others	-	-
TOTAL	**20,99,504**	**22,50,000**

MAHESHWARI P.A. & ASSOCIATES CHARTERED ACCOUNTANTS

NATIONAL INSTITUTE OF IMMUNOLOGY * NEW DELHI-67 *

NATIONAL INSTITUTE OF IMMUNOLOGY , Aruna Asaf Ali Marg , New Delhi

SCHEDULE FORMING PART OF INCOME AND EXPENDITURE FOR THE YEAR ENDED 31st MARCH 2020

SCHEDULE-10 : INCOME FROM INVESTMENTS

(Income on investments from Earmarked/ Endowment Funds transferred to Funds)	Amount in (₹)			
	Investment from Earmarked Fund		Investment - Others	
	Current Year	Previous Year	Current Year	Previous Year
1. Interest				
a) On Government Securities	-	-	-	-
b) Other Bonds/ Debentures	-	-	-	-
2. Dividends				
a) On Shares	-	-	-	-
b) On Mutual Fund Securities	-	-	-	-
3. Rents		-	30	30
4. Others	-	-	-	-
TOTAL	-	-	**30**	**30**
TRANSFERRED TO EARMARKED/ ENDOWMENT FUNDS	-	-	-	-

MAHESHWARI P.A. & ASSOCIATES CHARTERED ACCOUNTANTS

NATIONAL INSTITUTE OF IMMUNOLOGY * NEW DELHI-67 *

NATIONAL INSTITUTE OF IMMUNOLOGY , Aruna Asaf Ali Marg , New Delhi

SCHEDULE FORMING PART OF INCOME AND EXPENDITURE FOR THE YEAR ENDED 31st MARCH 2020

SCHEDULE-11 : INCOME FROM ROYALTY, PUBLICATION, ETC.

	Amount in (₹)	
	Current Year	**Previous Year**
1. Income from Royalty/Transfer of Technology	-	-
2. Income from Publications	-	-
3. Income from Consultancy	2,03,000	-
TOTAL	**2,03,000**	**-**

MAHESHWARI P.A. & ASSOCIATES CHARTERED ACCOUNTANTS

NATIONAL INSTITUTE OF IMMUNOLOGY NEW DELHI-67

NATIONAL INSTITUTE OF IMMUNOLOGY , Aruna Asaf Ali Marg , New Delhi
SCHEDULE FORMING PART OF INCOME AND EXPENDITURE FOR THE YEAR ENDED 31st MARCH 2020

SCHEDULE-12 : INTEREST EARNED

	Amount in (₹)	
	Current Year	**Previous Year**
1. On term Deposits		
a) With Scheduled Banks		-
b) With Non-Scheduled Banks		-
c) With Institutions		-
d) Others		-
2. On Savings Accounts		
a) With Scheduled Banks		-
b) With Non-Scheduled Banks		-
c) Post Office Savings Accounts		-
d) Others		-
3. On Loans		
a) Employees/Staff	-	-
b) Others		-
4. Interest on Debtors and other Receivables		-
TOTAL	-	-

MAHESHWARI P.A. & ASSOCIATES CHARTERED ACCOUNTANTS

NATIONAL INSTITUTE OF IMMUNOLOGY NEW DELHI-67

NATIONAL INSTITUTE OF IMMUNOLOGY, Aruna Asaf Ali Marg , New Delhi
SCHEDULE FORMING PART OF INCOME AND EXPENDITURE FOR THE YEAR ENDED 31st MARCH 2020

SCHEDULE-13 : OTHER INCOME

	Amount in (₹)	
	Current Year	**Previous Year**
1. Profit on Sale/Disposal of Assets		
a) Owned Assets	-	-
b) Assets acquired out of grant, or received free of cost	-	-
c) Sale of Scraps	7,44,689	83,295
2. Export Incentives realized	-	-
3. Fees for Miscellaneous Services	12,500	-
4. Miscellaneous Income	63,06,071	1,10,12,038
TOTAL	**70,63,260**	**1,10,95,333**

MAHESHWARI P.A. & ASSOCIATES CHARTERED ACCOUNTANTS

NATIONAL INSTITUTE OF IMMUNOLOGY NEW DELHI-67

NATIONAL INSTITUTE OF IMMUNOLOGY, Aruna Asaf Ali Marg , New Delhi
SCHEDULE FORMING PART OF INCOME AND EXPENDITURE FOR THE YEAR ENDED 31st MARCH 2020

SCHEDULE-14 : ESTABLISHMENT EXPENSES

	Amount in (₹)	
	Current Year	**Previous Year**
1 Salaries and Wages and allowances	27,59,69,119	24,87,41,191
2 Bonus	-	-
3 Contribution to CPF	1,42,53,596	2,54,43,119
4 Contribution to NSP	59,59,103	51,75,296
5 Contribution to Gratuity Fund	51,99,135	76,51,446
6 Staff Welfare Expenses	3,01,084	1,51,225
7 Expenses on Employes' Retirement and Terminal Benefits	30,40,765	71,13,228
8 Medical Expenses	1,08,24,393	93,12,701
9 Liveries & Uniforms	1,65,200	3,17,147
10 Leave Encashment	14,02,304	21,40,753
TOTAL	**31,71,14,699**	**30,60,46,106**

MAHESHWARI P.A. & ASSOCIATES CHARTERED ACCOUNTANTS

NATIONAL INSTITUTE OF IMMUNOLOGY NEW DELHI-67

NATIONAL INSTITUTE OF IMMUNOLOGY, Aruna Asaf Ali Marg , New Delhi

SCHEDULE FORMING PART OF INCOME AND EXPENDITURE FOR THE YEAR ENDED 31st MARCH 2020

SCHEDULE-15 : OTHER ADMINISTRATIVE/LAB EXPENSES, ETC.

		Amount in (₹)	
		Current Year	Previous Year
1	Purchases	9,18,82,621	7,63,58,453
2	Advertisement and Publicity	20,40,070	7,79,940
3	Auditor's Remuneration	35,000	41,376
4	Bank Charges	7,95,433	5,70,439
5	Balance Written Back	85,000	-
6	Consulatncy Charges	34,89,591	29,44,842
7	Electricity and Power	8,56,87,538	8,77,68,978
8	Expenses on Fees (JNU Affiliation)	6,00,000	6,00,000
9	Expenses on Seminars/Workshops(Regn/Mem Fee)	30,69,655	11,49,880
10	Foundation Day Expenses	8,46,558	6,54,083
11	Freight and Cartage	9,32,282	
12	Horticulture	40,92,237	40,20,219
13	Hospitality/Local Meeting Expenses	48,23,664	36,97,937
14	Interest on TDS/GST	5,776	-
15	Legal & Professional Charges	5,40,150	67,550
16	Manpower Hiring Charges	2,52,16,877	2,12,72,561
17	Miscellaneous Expenses	1,42,835	3,02,806
18	Office Maintenance/Expenditures	1,00,883	67,251
19	Patent Fee	48,83,176	47,67,613
20	Ph.D Examination Expenses	42,24,048	3,06,285
21	Postage, Telephone and Communication Charges	22,70,936	26,29,785
22	Printing and Stationary	33,99,580	44,76,877
23	Rent, Rates and Taxes	57,22,511	45,59,838
24	Repairs & Maintenance	6,37,64,412	5,01,65,774
25	Reprints	36,53,502	50,49,147
26	Scavenging Expenses	77,68,082	76,20,412
27	Security Services	1,16,25,506	95,00,969
28	Subscription	1,05,82,373	1,08,48,123
29	Student Welfare Expenses	76,858	-
30	Training Expenses	1,81,720	1,91,160
31	Travelling and Conveyance Expenses	42,45,103	40,38,518
32	Vehicle Insurance	1,17,370	29,115
33	Vehicle Running and Maintenance	6,25,858	3,50,425
34	Washing Charges	2,29,788	2,23,687
35	Water Charges	47,55,117	42,78,402
36	Foreign Exchange Gain/loss	(18,20,913)	1,85,896
37	Prior Period Item	-	35,90,057
	TOTAL	**35,06,91,197**	**31,31,08,398**

MAHESHWARI P.A. & ASSOCIATES CHARTERED ACCOUNTANTS

NATIONAL INSTITUTE OF IMMUNOLOGY * NEW DELHI-67 *

NATIONAL INSTITUTE OF IMMUNOLOGY, Aruna Asaf Ali Marg , New Delhi
SCHEDULE FORMING PART OF INCOME AND EXPENDITURE FOR THE YEAR ENDED 31st MARCH 2020

SCHEDULE-16 : EXPENSES ON GRANTS, SUBSIDIES, ETC.

	Amount in (₹)	
	Current Year	**Previous Year**
1 Grants given to Institutions/Organisations	-	-
2. Subsidies given to Institutions/ Organisations	-	-
TOTAL	-	-

MAHESHWARI P.A. & ASSOCIATES CHARTERED ACCOUNTANTS

NATIONAL INSTITUTE OF IMMUNOLOGY * NEW DELHI-67 *

NATIONAL INSTITUTE OF IMMUNOLOGY, NEW DELHI
SCHEDULE FORMING PART OF THE ACCOUNTS
FOR THE PERIOD ENDED 31ST MARCH, 2020

SCHEDULE 17 – SIGNIFICANT ACCOUNTING POLICIES & NOTES TO ACCOUNTS:-

1. **Accounting Convention:**

   The annual accounts have been prepared on historical cost convention (unless stated otherwise) & accrual system of accounting except in case of Government Grant (see point 6 below) & in case of interest on bank deposits, which are accounted for on actual receipt basis.

2. **Treatment of Grants:**

   2.1 Recurring Grants have been recognized in the Income & Expenditure Account in the year of receipt of grant in aid whereas Non-Recurring Grants have been treated corpus fund.

   2.2 Grants relatable to depreciable fixed assets are treated as deferred income and recognized in the Income & Expenditure Account on a systematic and rational basis over the useful life of such assets i.e. such grants are allocated to income over the periods and in the proportions in which depreciation is charged. During the year income recognized in respect of such Grants amount to ₹ 10,70,88,096/- including ₹ 1,53,86,033/- related to Non-recurring grant received under various projects (9,87,63,670/- in FY 2018-19 including ₹ 1,28,41,871/- in projects in that year).

3. **Investments:**

   In Investment, deposit with Reserve Bank of India is standing ₹ 1.74 Cr and RBI is giving interest on that.

4. **Fixed Assets, Depreciation & Amortization:**

   4.1 The depreciation has been provided as per the rates prescribed under the Income Tax Act, 1961 following Written Down Value method and Rule made thereunder.

   4.2 Fixed assets have been created with grants received from the various funding agencies. The condition of these grants, inter alia, stipulates that assets will be the property of Funding Agencies who will be free to sale or otherwise dispose off. The funding agencies have the discretion to gift these assets to the Institute, if it considers appropriate, but no such gifts have been made so far. None of those assets had so far been sought back by any of the funding agencies.

5. **Consumable Stores:**

   All purchases such as chemicals, glassware, consumables, animal diet and stationery have been charged to consumption at the time of purchase without working out closing stock at the end of the year.

6. **Government Grants/ Subsidies:**

   6.1 Government Grants of the nature of non-depreciable assets are treated as Capital Reserves and in respect of depreciable assets are treated as part of Fixed Assets Fund under Corpus.

   6.2 Government Grants are accounted on the basis of receipt of cheques/ transfers.

MAHESHWARI P.A. & ASSOCIATES

NATIONAL INSTITUTE OF IMMUNOLOGY * NEW DELHI-67 *

7. Foreign Currency Transaction:

Transactions in foreign currencies are recorded at the exchange rate prevailing on the date of transaction and exchange differences are recognized in the Statement of Income and Expenditure.

8. Retirement Benefits:

8.1 Liability towards gratuity payable on death/retirement of employee is calculated on the actual qualifying service of each employee as of the close of the financial year (as against the requirements of AS-15 Issued By ICAI) and net amount after taking into account the interest earned on investments during the year is transferred to the Gratuity Fund.

8.2 No provision for accumulated leave encashment benefit to the employees has been ascertained and provided at the year end, in terms of requirements of AS-15 issued by ICAI.

9. Project Grants:

9.1 The Institute receives extra mural project grants from National and International agencies for specific research programmes.

9.2 The Institute has a policy of allocating its overheads and transfer of its expenditure to different projects at the year-end on reasonable estimate basis after taking into account the amount of maximum permissible limits for overheads and expenditure sanctioned by the funding agency for each project.

9.3 **The Institute has made excess expenditure over released grant amounting to ₹ 2,17,34,033/- (PY ₹ 2,25,51,991/-) in 57 Projects. For which payment has not been received from the Govt. or the Granting Agencies. Out of these 57 Projects most of the projects are older than 3 years and no amount has been received out of these projects.**

9.4 As on 31st March 2020, thirteen number of earmarked project has already been closed on account of their tenure expiring/project execution, as applicable. Their respective balances included under the head "Earmarked/Endowment Funds" in the balance sheet as on that date and aggregating to ₹ 13,39,223/- Credit Balance (PY ₹ 14,84,175/- Credit Balance) are subject to reconciliation with the granting agencies.

9.5 The Institute has outstanding balance in Project- Land amounting Rs. 2.56 Cr, which have been received for stamp duty, but now no stamp duty is to be borne by Govt. Departments so it has been refunded on 27th May 2019 to Translational Health Science And Technology Institute for construction of boundary wall at Faridabad.

10. Staff Advances

Staff advances of ₹ 7,32,630/- (PY ₹ 2,33,000/-) are subject to confirmation/ adjustment.

11. Gratuity

Gratuity amounting to ₹ 16,09,55,911/- (PY ₹ 15,03,01,351/-) payable to staff of the Institute has been ascertained up to the year ended.

12. Advances to suppliers

Advances to suppliers for Consumable and Equipment for ₹ 1,15,40,746/- (PY ₹ 5,33,579/-) are subject to confirmation/ adjustment.

13. Taxation

In view of the tax exemption status of the National Institute of Immunology, no provision for Income Tax had been considered necessary.

MAHESHWARI & ASSOCIATES * CHARTERED ACCOUNTANTS *

NATIONAL INSTITUTE OF IMMUNOLOGY * NEW DELHI-67 *

14. Details of Payments to Auditors:

Particulars	Year Ended 31st March 2020	Year Ended 31st March 2019
Payment to auditors:		
- Statutory audit fee*	₹35,000	₹35,000
- Other Professional fees	₹35,000	-
Total	**₹70,000**	**₹35,000**

* Payments to auditors are exclusive of taxes

15. Contingent Liabilities & Commitments

a) Claims against the Institute acknowledge as debt - Nil

b) Guarantees – Nil.

c) Estimated amount of contracts remaining to be executed on capital account and not provides for – Nil.

d) Other contingent liabilities and commitments – A case is pending of Sh. Madan Mohan & ors vide case no. W.P. © 8629/2014 filed for grant of pay scale to Section Officer, Private secretaries, management Assistant at par with CSS/CSSS cadre in Delhi High Court, but certain amount could not be identified for the above case.

16. Others:

a) Balances from various parties on accounts of receivable and payables (not stated otherwise) are subject to confirmation/reconciliation from/with respective parties.

b) Accounting policies not referred to otherwise are consistent with General Accepted Accounting Principles in India (Indian GAAP).

c) The National Institute of Immunology (herein after called as 'Institute') had paid in Financial Year 2008-09 ₹ 32 Crores to Municipal Corporation, Faridabad (MCF) towards the cost of 160 acres of continuous piece of land situated at common boundary of village Bhankri & village Badkhal, Distt. Faridabad, Haryana. The possession of land had been handed over to the Institute but the conveyance deed has been executed only for 85.20 acres in FY 2016-17 and balance still to be executed due to stay against the same from Hon'ble High Court of Punjab & Haryana. The matter is also under representation with the Department of Biotechnology, Government of India.

d) The CPF Trust of the employees of the Institute does not prepare separate financial statements and is being managed by board of Trustees being Ex-Officio Members / Nominated from the Institute. Accordingly its balances are shown in the financial statement of the Institute. The investment of Trust includes Special Deposit made under RBI (SDS-1972) scheme amounting to ₹ 17,403,333/-.

MAHESHWARI P.A. & ASSOCIATES CHARTERED ACCOUNTANTS

NATIONAL INSTITUTE OF IMMUNOLOGY NEW DELHI-67

e) The Receipt & Payment Account had been prepared using direct method presenting all receipts and payments during the year under major heads.

f) The Institute has leased out 125.20 acre of land to THSTI w.e.f. 2nd January 2018 for 30 years at the rate of ₹ 1 per year. For this, the Institute has received ₹ 30 for 30 years toward lease payments from THSTI on 17.05.2018.

g) During the year ended 31.03.2013, a loss of ₹ 66.63 lakhs, on account of fire in Structural Biology Unit was assessed on the basis of their latest replacement/ repairs cost of equipments, whereas the actual book value of the completely damaged equipments have been reported as ₹ 28.84 lakhs and ₹ 6.20 lakhs as actual repair cost of partially damaged equipments, totaling to ₹ 35.04 lakhs. The adjustment for loss is awaited approval of Ministry of Finance through DBT.

h) Schedules 1 to 16, Schedule 17 (containing significant accounting policies & notes to accounts) along with Annexures 1 to 214 are annexed to & form an integral part of financial statement (ie. Balance Sheet , Income and Expenditures Account and Receipt and Payment Account) of the Institute for FY 2019-20.

i) NPA a sum of Rs. 21,01,262 to Dr. Satyajit Rath and Rs. 20,26,062 to Vineeta Bal has been paid for the period 01-06-2009 to 31-3-2017 and 01-06-2009 to 30-11-2016 out of that ₹ 13,52,068 and ₹ 12,49,000 payable towards retirement benefits and salary payable on implementation of 7th pay commission has been put on hold and a letter has been sent to them on 16th April 2018 to pay ₹ 7,49,194 and ₹ 7,77,062 respectively to NII for balance dues.

17. Previous year figures have been regrouped/ rearranged wherever considered necessary.

Signatures for National Institute of Immunology, New Delhi-110067

NATIONAL INSTITUTE OF IMMUNOLOGY * NEW DELHI-67 *

(Dr. AMULYA KUMAR PANDA)
Director

(P S RAWAT)
F & AO

For Maheshwari P A and Associates
Chartered Accountant
FRN No. 0120236

MAHESHWARI P.A. & ASSOCIATES * CHARTERED ACCOUNTANTS

(CA. Abhishek Goel)
Partner
M. No. 412467

Place: New Delhi
Date: 11th September 2020

NATIONAL INSTITUTE OF IMMUNOLOGY, NEW DELHI
SCHEDULE FORMING PART OF THE ACCOUNTS
FOR THE PERIOD ENDED 31st MARCH, 2020

SCHEDULE 17 – SIGNIFICANT ACCOUNTING POLICIES & NOTES TO ACCOUNTS:-

1. Accounting Convention:

The annual accounts have been prepared on historical cost convention (unless stated otherwise) & accrual system of accounting except in case of Government Grant (see point 6 below) & in case of interest on bank deposits, which are accounted for on actual receipt basis.

2. Treatment of Grants:

2.1 Recurring Grants have been recognized in the Income & Expenditure Account in the year of receipt of grant in aid whereas Non-Recurring Grants have been treated corpus fund.

2.2 Grants relatable to depreciable fixed assets are treated as deferred income and recognized in the Income & Expenditure Account on a systematic and rational basis over the useful life of such assets i.e. such grants are allocated to income over the periods and in the proportions in which depreciation is charged. During the year income recognized in respect of such Grants amount to 10,70,88,096/- including 1,53,86,033/- related to Non-recurring grant received under various projects (9,87,63,670/- in FY 2018-19 including 1,28,41,871/- in projects in that year).

3. Investments:

In Investment, deposit with Reserve Bank of India is standing 1.74 Cr and RBI is giving interest on that.

4. Fixed Assets, Depreciation & Amortization:

4.1 The depreciation has been provided as per the rates prescribed under the Income Tax Act, 1961 following Written Down Value method and Rule made thereunder.

4.2 Fixed assets have been created with grants received from the various funding agencies. The condition of these grants, inter alia, stipulates that assets will be the property of Funding Agencies who will be free to sale or otherwise dispose off. The funding agencies have the discretion to gift these assets to the Institute, if it considers appropriate, but no such gifts have been made so far. None of those assets had so far been sought back by any of the funding agencies.

5. Consumable Stores:

All purchases such as chemicals, glassware, consumables, animal diet and stationery have been charged to consumption at the time of purchase without working out closing stock at the end of the year.

6. Government Grants/ Subsidies:

6.1 Government Grants of the nature of non-depreciable assets are treated as Capital Reserves and in respect of depreciable assets are treated as part of Fixed Assets Fund under Corpus.

6.2 Government Grants are accounted on the basis of receipt of cheques/ transfers.

7. Foreign Currency Transaction:

Transactions in foreign currencies are recorded at the exchange rate prevailing on the date of transaction and exchange differences are recognized in the Statement of Income and Expenditure.

8. Retirement Benefits:

8.1 Liability towards gratuity payable on death/retirement of employee is calculated on the actual qualifying service of each employee as of the close of the financial year (as against the requirements of AS-15 Issued By ICAI) and net amount after taking into account the

interest earned on investments during the year is transferred to the Gratuity Fund.

8.2 No provision for accumulated leave encashment benefit to the employees has been ascertained and provided at the year end, in terms of requirements of AS-15 issued by ICAI.

9. Project Grants:

9.1 The Institute receives extra mural project grants from National and International agencies for specific research programmes.

9.2 The Institute has a policy of allocating its overheads and transfer of its expenditure to different projects at the year-end on reasonable estimate basis after taking into account the amount of maximum permissible limits for overheads and expenditure sanctioned by the funding agency for each project.

9.3 The Institute has made excess expenditure over released grant amounting to 2,17,34,033/- (PY 2,25,51,991/-) in 57 Projects. For which payment has not been received from the Govt. or the Granting Agencies. Out of these 57 Projects most of the projects are older than 3 years and no amount has been received out of these projects.

9.4 As on 31st March 2020, thirteen number of earmarked project has already been closed on account of their tenure expiring/project execution, as applicable. Their respective balances included under the head "Earmarked/Endowment Funds" in the balance sheet as on that date and aggregating to 13,39,223/- Credit Balance (PY 14,84,175/- Credit Balance) are subject to reconciliation with the granting agencies.

9.5 The Institute has outstanding balance in Project- Land amounting Rs. 2.56 Cr, which have been received for stamp duty, but now no stamp duty is to be borne by Govt. Departments so it has been refunded on 27th May 2019 to Translational Health Science And Technology Institute for construction of boundary wall at Faridabad.

10. Staff Advances

Staff advances of 7,32,630/- (PY 2,33,000/) are subject to confirmation/ adjustment.

11. Gratuity

Gratuity amounting to 16,09,55,911/- (PY 15,03,01,351/-) payable to staff of the Institute has been ascertained up to the year ended.

12. Advances to suppliers

Advances to suppliers for Consumable and Equipment for 1,15,40,746/- (PY 5,33,579/) are subject to confirmation/ adjustment.

13. Taxation

In view of the tax exemption status of the National Institute of Immunology, no provision for Income Tax had been considered necessary.

14. Details of Payments to Auditors:

15. Contingent Liabilities & Commitments

Particulars	Year Ended 31st March 2019	Year Ended 31st March 2019
*Payment to auditors:		
- Statutory audit fee*	35,000	35,000
- Other Professional fees	35,000	-
Total	**70,000**	**35,000**

* Payments to auditors are exclusive of taxes

a) Claims against the Institute acknowledge as debt - Nil

b) Guarantees – Nil.

c) Estimated amount of contracts remaining to be executed on capital account and not provides for – Nil.

d) Other contingent liabilities and commitments – A case is pending of Sh. Madan Mohan & ors vide case no. W.P. © 8629/2014 filed for grant of pay scale to Section Officer, Private secretaries, management Assistant at par with CSS/CSSS cadre in Delhi High Court, but certain amount could not be identified for the above case.

16. Others:

a) Balances from various parties on accounts of receivable and payables (not stated

otherwise) are subject to confirmation/ reconciliation from/with respective parties.

b) Accounting policies not referred to otherwise are consistent with General Accepted Accounting Principles in India (Indian GAAP).

c) The National Institute of Immunology (herein after called as 'Institute') had paid in Financial Year 2008-09 32 Crores to Municipal Corporation, Faridabad (MCF) towards the cost of 160 acres of continuous piece of land situated at common boundary of village Bhankri & village Badkhal, Distt. Faridabad, Haryana. The possession of land had been handed over to the Institute but the conveyance deed has been executed only for 85.20 acres in FY 2016-17 and balance still to be executed due to stay against the same from Hon'ble High Court of Punjab & Haryana. The matter is also under representation with the Department of Biotechnology, Government of India.

d) The CPF Trust of the employees of the Institute does not prepare separate financial statements and is being managed by board of Trustees being Ex-Officio Members / Nominated from the Institute. Accordingly its balances are shown in the financial statement of the Institute. The investment of Trust includes Special Deposit made under RBI (SDS-1972) scheme amounting to 17,403,333/-.

e) The Receipt & Payment Account had been prepared using direct method presenting all receipts and payments during the year under major heads.

f) The Institute has leased out 125.20 acre of land to THSTI w.e.f. 2nd January 2018 for 30 years at the rate of 1 per year. For this, the Institute has received 30 for 30 years toward lease payments from THSTI on 17.05.2018.

g) During the year ended 31.03.2013, a loss of 66.63 lakhs, on account of fire in Structural Biology Unit was assessed on the basis of their latest replacement/ repairs cost of equipments, whereas the actual book value of the completely damaged equipments have been reported as 28.84 lakhs and 6.20 lakhs as actual repair cost of partially damaged equipments, totaling to 35.04 lakhs. The adjustment for loss is awaited approval of Ministry of Finance through DBT.

h) Schedules 1 to 16, Schedule 17 (containing significant accounting policies & notes to accounts) along with Annexures 1 to 214 are annexed to & form an integral part of financial statement (ie. Balance Sheet , Income and Expenditures Account and Receipt and Payment Account) of the Institute for FY 2019-20.

I) NPA a sum of Rs. 21,01,262 to Dr. Satyajit Rath and Rs. 20,26,062 to Vineeta Bal has been paid for the period 01-06-2009 to 31-3-2017 and 01-06-2009 to 30-11-2016 out of that 13,52,068 and 12,49,000 payable towards retirement benefits and salary payable on implementation of 7th pay commission has been put on hold and a letter has been sent to them on 16th April 2018 to pay 7,49,194 and 7,77,062 respectively to NII for balance dues.

17. Previous year figures have been regrouped/ rearranged wherever considered necessary.

Signatures for National Institute of Immunology, New Delhi-110067

For Maheshwari P A and Associates
Chartered Accountant
FRN No. 012023C

Sd/-
(Dr. AMULYA KUMAR PANDA)
Director

Sd/-
(P S RAWAT)
F & AO

Sd/-
(CA. Abhishek Goel)
Partner
M. No. 412467

Place: New Delhi
Date: 11th September 2020

NATIONAL INSTITUTE OF IMMUNOLOGY
(An autonomous research institute under the Department of Biotechnology (DBT), Government of India)
Aruna Asaf Ali Marg, New Delhi - 10067, India
Phone: 91 11-267117121, 26717145; Fax: 91 11-26742125 / 91 11-26742626
URL: www.nii.res.in