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AIVI  **NEWSLETTER**

VOLUME-2

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Release of Inaugural Issue of AIVI eNewsletter (L-R) Prof. Vinod Joshi, Dy Director AIVI; Prof. (Dr.) Balvinder Shukla, Vice Chancellor, Amity University, Uttar Pradesh; Prof. Narayan Rishi, Advisor, AIVI

FROM THE ADVISOR'S DESK



The last two semesters have seen some hectic activity with the institution growing in all areas. Four new faculties with stellar backgrounds have joined us adding new dimensions to the overall specialist portfolio of the institute. The under graduation programme in Life Sciences with emphasis on Immunology, Virology and Genomics in final year of the program took off sprightly with 30 brilliant and energetic students. While allowing the students to establish their foundations in all subdivisions of biology, it prepares them for their future to specialise in any area of their choice at Master's level. Genomics has fast grown as a science over the last decade or so. Keeping in mind the growing need for specialized technical personnel in this area, a master's programme in Genomics was also introduced.

It is the best award to us the teachers when our students work hard, give their best shot and come out as achievers which we immensely cherish all time. These achievements inspire many more students to reach their goals. One of our PhD students, Nitya Sharma's project on meningococcal vaccine production in collaboration with MSD Wellcome Trust Hilleman Laboratories was selected for the Prime Minister's Fellowship award to the student. The Sanghatan saw our undergrad student Aprajita Jha wins Silver in the 200 m running event. Palak Malhotra topped her class in the MSc Immunology programme. We are proud of your achievements and hope that you will win many more laurels in the future.

In the past year, the faculty of the institution have published articles in leading journals, presented papers in national and international conferences and undertaken training programmes. Two externally funded projects also were awarded. Once again the cell culture training workshop was well received and we were also able to organise a workshop on Biosecurity and Biosafety conducted by National Institute of Virology, Pune.

Narayan Rishi
Advisor
Amity Institute of Virology and Immunology

EDITORIAL

Antibiotics have been the mainstay in the fight against infectious diseases of bacterial origin. But bacteria are smart; they quickly develop resistance to the antibiotic necessitating changing the prescription. Since new antibiotics were being discovered quickly, the fight against infections had the upper hand and bacterial resistance to antibiotics was a non-issue, at least publicly. Profiteering motives of manufacturing firms resulted in promotion of their non-therapeutic uses as preventives and growth promoters in animal farms across the globe. With bacteria being exposed to sub lethal antibiotic levels in the environment, the problem of resistance only amplified. Rampant preventive misuse of antibiotics even to treat common cold became a habitual practice further fuelling the resistance development. However, the growing bacterial resistance to antibiotics coupled with the pipeline of new antibiotic reaching the market running dry, regulators have stepped in to curtail the non-therapeutic use of antibiotics. The initial symptoms of a patient with infection cannot often be used to ascertain whether it is of viral or bacterial origin, discerning which will take time. This robs the clinician of valuable time thus prompting them to start treatment with broad spectrum antibiotics until test results are available, a needless action when the infection is of viral origin. Clinicians and patients would be greatly benefited if they could quickly obtain the results to identify subjects with bacterial infection.

Bhattacharya et al in their recently in the journal 'Scientific Reports' report the use of peripheral blood gene expression profiling to identify bacterial infections from viral. In lower respiratory tract infections (LRTI) in adults as a model, they employed the state of the art RNAseq and qPCR technologies to show significant differential expression in 10 genes that could be used to differentiate between bacterial and viral infections. Both technologies are rapid and results would be available in a few hours, a significant reduction from current procedures that may take days. While the clinical use of this procedure may take a while, since it would need to be tested over larger sample sizes in varied settings, also given the current cost of these technologies, it would challenge most medical budgets. However, it is a promising edge in the first step to diagnose bacterial infections that will allow better management of antibiotic based therapies.

Coming to this issue of our e-newsletter, it brings to you a range of articles from faculty and students. Let's read about how Dengue can be prevented, update our know-how on malaria and how allergies can be managed. Pollution is a serious problem created by mankind and inside see how it affects our immune system making us vulnerable to disease. Pricing of medications and medical devices has always been a contentious issue. The National Pharmaceutical Pricing Authority capped the upper limit of stents, a crucial device that gives hope to thousands of heart patients. The newsletter caps off with brief notes on the revolutionary CRISPR-CAS technology and epigenetics.



Dr. Vinod Joshi,
Professor & Dy. Director

Dr. Vinod Joshi, Professor & Deputy Director in the Amity Institute of Virology & Immunology joined Amity University, Noida on 2nd November 2016 after taking voluntary retirement from the post of Scientist-G & Head, Virology & Molecular Biology at Desert Medicine Research Centre (Indian Council of Medical Research) at Jodhpur, Rajasthan. Prof Joshi is a renowned scientist in the field of Dengue, Malaria, Pandemic Influenza A (H1N1) 2009 virus, Cutaneous Leishmaniasis and Guinea worm disease. He was an eminent member in the National Commission for eradication of Guinea worm disease from the country. He has published many papers in journals of International and National repute and one of his papers on first report from India on Transovarial transmission of dengue virus and first report of world on persistence of transovarial transmission across 7 generations of mosquitoes has been cited as one of the best paper in the 100 years of ICMR research. He has been granted crores of funds from both International and National funding organizations and has also been awarded Medical Innovation Award by ICMR, New Delhi. He has developed a new intervention strategy for control of dengue transmission. He has guided 10 Ph.D. students and many graduate and post graduate students. Prof Joshi has a patent "Affinity Biosensor of Dopamine" to his credit. He has published 28 gene sequences of Dengue viruses from Rajasthan and has reported first complete genome of DENV-3 from Rajasthan, India.

AND THE AIVI FAMILY EXPANDS...



Dr. Bennet Angel
Sr. Scientist, Grade-II

Dr. Bennet Angel joined Amity Institute of Virology and Immunology on 5th December 2016 as Senior Scientist Grade II. Dr. Angel possesses a research experience of 12 years in the field of Proteomics and Genomics of Dengue and H1N1 viruses. Before joining the Institute she has worked in various project positions at Desert Medicine Research Centre, Indian Council of Medical Research, Jodhpur, Rajasthan. Her major research achievements includes reporting of First proteomic basis of Transovarial transmission of dengue virus from India; Typing of Aedes mosquitoes as a new possible surveillance tool for Dengue Hemorrhagic Fever and Establishment of a new concept that multiple Dengue Virus types could cause DHF even during primary infection of dengue. She has published 17 papers in journals of National and International repute and has submitted 28 Dengue virus gene sequences in NCBI, USA database. She has received training from National Institute of Virology, Pune in handling and diagnosing Pandemic Influenza A (H1N1) 2009 virus and also in culturing mosquito cell lines for Dengue virus detection. She has also received training from National Institute of Cancer Prevention and Research, Noida in molecular techniques related to cancer. During 2009 pandemic of Swine Flu, Dr. Angel has performed as leading laboratory scientist to provide molecular diagnosis of Pandemic Influenza A (2009) H1N1 viruses to the state hospitals under the Govt. of Rajasthan. During her career so far, she has been awarded Gold medal for securing First Class First Position in her Masters exam in 2004. In 2005, she cleared the State Level Eligibility Test for Lecturership. Dr. Angel was also awarded with the Research Associateship of ICMR, New Delhi in 2010. She has guided many graduate, post graduate and doctoral students in their dissertation work and has trained many medical doctors, health professionals, BSF professionals in handling viruses and maintaining BSL-2 Virology laboratory.



Dr. Ashish Srivastava
Sr. Scientist, Grade-II

Dr. Ashish Srivastava has joined Amity Institute of Virology & Immunology on 5th December, 2016. Before joining Amity, he was a visiting scientist at South Dakota State University, Brookings, USA. He possesses 8 years of research experience in the field of Plant Molecular Virology and has characterized several Begomoviruses infecting various economically important crops such as Tomato, Jatropha, Amaranthus, Poppy, Ornamental plants etc. Dr. Srivastava has also identified 4 novel Begomovirus species affecting cultivation of Jatropha in India and studied the diversity among Begomoviruses. His research contributions include, revealing the compatible and non-compatible interactions of Begomovirus with medicinally important crop *Papaver somniferum* and a highly proteinaceous crop *Amaranthus hypochondriacus*, management of viruses by systemically inducing resistance mediated defense using plant growth promoting rhizobacteria, such as *Paenibacillus lentimorbus* and revealing relationship of induced programmed cell death with the infection of *ageratum enation* virus. His work is being recognized by many researchers all around the globe.



Dr. Chhavi Goel
Research Associate

Dr Chhavi Goel joined Amity Institute of Virology & Immunology in June 2017. She did her Ph.D. from the Department of Allergy and Immunology at the CSIR Institute of Genomics and Integrative Biology, Delhi in 2015. Her doctoral research work included studying the role of proteolytic activity of purified cockroach allergen on the polarizing potential of dendritic cells and the consequent T cell responses. With the help of flow-cytometry and immunological assays, she was able to assess some of the cell markers and secretory molecules that were modulated by the protease allergen. Her main research interest includes allergic diseases, immunomodulators and therapeutic strategies. Her work has been published in International Journals of high repute. She is also a Junior Member Affiliate in the European Academy of Allergy and Clinical Immunology. One of her research abstract was declared outstanding at the WAO International Scientific Conference, held at Hyderabad in 2012. During the year 2011, she availed the International Travel Grant Scholarship for attending the 30th Congress of European Academy of Allergy and Clinical Immunology in Istanbul and was also awarded Senior Research Fellowship by Indian Council of Medical Research, New Delhi during the same year. Dr. Goel has qualified GATE with an All India Rank of 195 in 2007. She has also been bestowed with Gold medal during her Master degree in 2006.

AIR POLLUTION: A GREAT IMPACT ON SUSTAINABILITY OF IMMUNE SYSTEM

“Environmental pollution is an incurable disease, it can only be prevented” - Barry Commoner

Our planet “The Earth” is serving us self-sacrificingly with all the resources but we have never been kind enough towards the natural resources. One of the most catastrophic outcomes of ever-increasing population and expanding industrialization is environmental pollution, which ultimately leads to compromised public health. According to World Health Organization (WHO), an estimated 12.6 million people died across the globe as a result of living or working in an unhealthy environment in 2012. WHO has also reported that 24% of the global disease burden and 23% of all deaths are attributable to environmental factors. The majority of burden is contributed by low and middle income countries, where approximately 7.3 million deaths are credited to indoor and outdoor pollution. In the past two decades, environmental pollution has grown up exponentially and so as the disease incidences. This suggests crucial role of environmental pollutants in the weakening of immune system and emphasizes a thorough research to establish an exact co-relation between environmental pollutants and sustainability of immune system.

All categories of pollution (air, water, soil and noise) significantly influence immune system of our body and play a crucial role in development of many life threatening ailments such as infectious diseases and autoimmune disorders. Consequently, there is an endless list of health issues associated with environmental pollution. Air pollution is the most common type of pollution and both the ambient air quality in urban areas and indoor air quality in rural areas are of great concern. According to WHO, mortality rate due to both indoor and outdoor pollution are 3.3 million and 2.6 million deaths per year, respectively. Globally, 67% of all deaths occur due to ambient air pollution. Air pollution is found to be a major cause of mortality in Asia, western and central sub-saharan Africa, Eastern Europe and Central Europe. According to Central Pollution Control Board (CPCB), air quality in 49 cities of India is exceeding the National Ambient Air Quality (NAAQ) Standards (50 $\mu\text{g}/\text{m}^3$ for SO_2 , 40 $\mu\text{g}/\text{m}^3$ for NO_2 & 60 $\mu\text{g}/\text{m}^3$ for PM_{10} for Residential/industrial/other area) and PM_{10} level is very high in most of the cities including Delhi, Raipur, Punjab etc (“CPCB

Annual Report 2011-12,” 2013). With each passing day, new air pollutants are added to the already existing long list of the life threatening pollutants viz. sulfur oxides (SO_2), nitric oxide (NO), nitrogen dioxide (NO_2), volatile organic compounds (VOCs), carbon monoxide, particulate matter (PM), chlorofluorocarbons (CFC), radioactive pollutants etc. These pollutants are associated with respiratory, cardiovascular and nervous system disorders. Several research findings have suggested the plausible role of pollutants in heart related illnesses such as inflammation, myocardial infarction (heart attack) and coronary atherosclerosis. Almost all kinds of air-pollutants remarkably influence both innate and adaptive type of immune response. Both lead and cadmium suppress B-cells and regulatory T-cells (Tregs) especially in asthma patients. The foremost perpetrator of air pollution is particulate matter and according to a research in mice models, PM promptly leads to lung inflammation by activating toll-like receptor 4 (TLR4), an important protein of innate immune system. PM_{10} is associated with increased level of cytokines (Interleukin-6) which exacerbates the synthesis of C-reactive protein (CRP). CRP is an inflammation marker and high concentration of CRP can lead to elevated risks of cardiovascular diseases. Some hazardous pollutants like aluminumnano and particulate matter have potential to cross blood-brain barrier which further directs neuro inflammation, oxidative stress

and neuron damage. Air pollution is also a key factor in increasing rate of heart attacks by augmenting clogging of arteries. Also, exponentially increasing air pollution and smokers exacerbates lung cancer.



Based on the strength of technical information available regarding the deleterious impact of air pollution on immune system, it is an alarming situation and urgent interventions are needed to be taken. There is a need to increase the depth of the research on adverse effects of pollution and preventive measures to mitigate this problem. Recently Supreme Court of India has announced various directive measures for all type of vehicles, industries and many commercial divisions to overcome the health issues associated with air pollutants. Beside government, we can also participate in controlling air pollution by a number of ways such as car-pool, regular pollution check of vehicles, switching-off all electrical appliances when not required, growing more trees etc. Overall, both the people of the country and the governing agencies have to come forward to combat pollution in order to maintain a good quality of life, cleaner environment and economic stability.



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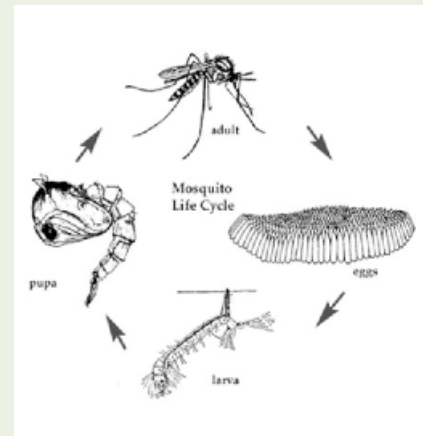
DENGUE: AN EMERGING PUBLIC HEALTH PROBLEM

The dengue virus is emerging as potent virus causing high morbidity and mortality worldwide. In 2016, 129166 cases and 245 deaths were reported from India and the number is still on its increasing trends. Since no chemotherapy or vaccine is yet available against this disease, it therefore, seems important to understand the etiology of the disease to undertake preventive and control measures. The world of dengue revolves around three systems: the vertebrate host-humans, the invertebrate vector-Aedes mosquitoes and the invisible intracellular replicating pathogen-the 10kb long Dengue virus.

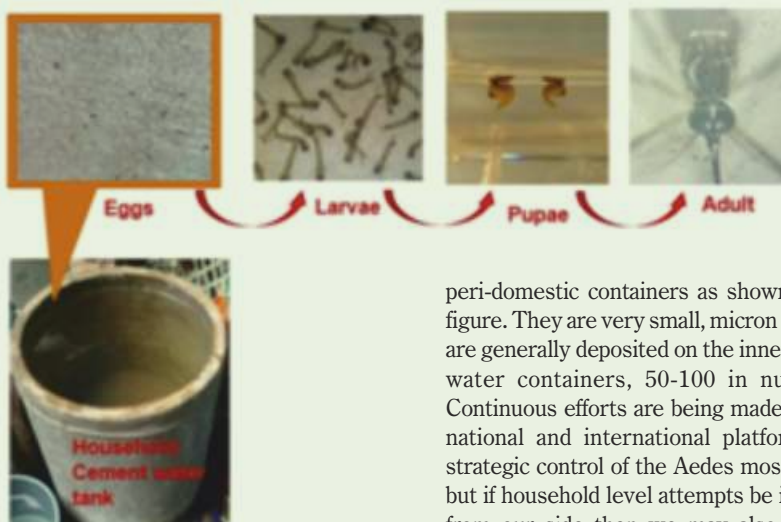
The virus is known to circulate in nature as four different types (DENV-1, DENV-2, DENV-3 and DENV-4) each capable of infecting the human system and expressing high grade fever, nausea, vomiting, pain in joints and rashes. If infection occurs by more than one form within a particular time gap then it may lead to the hemorrhagic forms (Dengue Hemorrhagic Fever), plasma leakage, which may lead to mortality. Two types of virus transmission cycle exist; the horizontal i.e. man to man through bite of infected Aedes mosquito and the vertical transmission; from mosquitoes to their progeny.

Generally, the female Aedes mosquitoes require vertebrate blood for their egg production and development therefore they feed on human blood. During this blood meal, the virus if present in the mosquito system is injected into the human host where the virus finds the host system efficient for its replication and multiplication. The transmission cycle continues when uninfected mosquito feeds on blood of the infected human and bites to another healthy person. Within the Aedes mosquitoes, the virus replicates inside the cells lining the midgut and then slowly infects other organs like ovaries, fat bodies and salivary glands etc. When these eggs are laid by the infected mosquitoes in protected niches, the virus survives within them for years and during favorable environmental conditions when these eggs hatch into larval forms, the new generation already has the virus infection through vertical mode. To intervene into the transmission cycle of dengue and opt for some preventive measures, we need to look into some checkpoints, wherein when appropriate measures be introduced, the disease transmission may be controlled.

The Aedes mosquitoes undergo an indirect development: Eggs > larvae > Pupa > Adult. The eggs are laid in domestic and



important role in eliminating the virus. Integrated elimination of eggs, larvae and adult forms will be effective. Some entomological studies conducted by us have reported elimination of Aedes eggs by rubbing the inner surface of the containers. Besides this, indoor flower pots, decorative vessels, coolers, cement containers, plastic containers, indoor and peri-domestic water collections be continuously monitored and cleaned thoroughly from time to time to ensure no breeding of Aedes mosquitoes. As the adult forms are day biting, hence use of mosquito repellents will be safe.



peri-domestic containers as shown in the figure. They are very small, micron size and are generally deposited on the inner side of water containers, 50-100 in numbers. Continuous efforts are being made both at national and international platforms for strategic control of the Aedes mosquitoes, but if household level attempts be initiated from our side then we may also play as



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CRISPR/CAS SYSTEM, A REVOLUTIONARY IMMUNITY BOOSTER IN PLANTS

Viruses are a serious threat to agriculture worldwide as they cause drastic reduction in the production of various crops of economic importance. With the advent of genome-engineering based strategies, we are now able to develop virus-resistant crops proving the technique to be a promising futuristic tool. The CRISPR (Clustered Regularly Interspaced Palindromic Repeats)/ CRISPR-associated 9 (Cas9) system is a powerful genome engineering tool which is being utilized to edit, delete or insert novel traits into genome precisely at a chosen loci. This system has also emerged as a potential technique to overcome the virus infection either by directly interfering with the virus genome or by interfering with the host factors required for normal viral functioning in the host. In recent studies, the DNA viral genomes of Tomato yellow leaf curl virus (TYLCV) (Ali et al., 2015); Bean yellow dwarf virus (BeYDV) (Baltes et al., 2015); Beet severe curly top virus (BSCTV) and

Cotton leaf curl Kokhran virus (CLCuKoV) (Ali et al., 2016) were targeted by CRISPR/ Cas 9 to develop the Begomovirus resistant crops. Similarly, FnCas9 and C2c2 were applied for the development of RNA virus resistance by targeting the RNA virus genome.

Alternatively, the CRISPR/ Cas 9 system is also being used to edit host genome to alter various host factors which take part in the viral replication, transcription or translation. In Israel, Chandrasekaran et al. (2016) mutated translation initiation like factors, eIF4E and demonstrated resistance developed towards one Ipomovirus (Cucumber vein yellowing virus) and two Potyviruses (Zucchini yellow mosaic virus and Papaya ring spot mosaic virus-W) of family Potyviridae. Thus, CRISPR/ Cas 9 based modifications in plants are greatly contributing to boost immunity in the plants which are highly susceptible to virus

infection. The future researches will provide novel approaches of CRISPR/ Cas system in developing virus resistant crops and will thus indirectly help in the development of a variety of marketable crops.



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SELF AND THERAPEUTIC MANAGEMENT OF ALLERGIC DISEASES

Allergy is a common phenomenon that almost every individual experiences in once in his or her lifetime. The incidence of allergy is increasing globally. In India, approximately 20-30 % of total population suffers from at least one allergic disease. These allergic diseases comprises of asthma, rhinitis, drug, food and insect allergy, eczema, urticaria, angioedema and anaphylaxis.

Allergy or allergic diseases occurs when the body's immune system reacts abnormally to a foreign substance that is usually harmless and poses little or no problem. Such foreign substances are referred as allergens and they arise from different sources such as pollens, fungi, food, insects, bee venom, animal dander, medicinal drugs etc. Usually, these substances are harmless but these may react abruptly in certain people causing adverse reactions. Typical symptoms that appear during allergic diseases include inflammation characterized by redness,



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rash, itching, swelling, coughing, wheezing, running nose and shortness of breath. The severity of allergies varies from person to person and can range from minor irritation to anaphylaxis — a potentially life-threatening emergency. Generally the symptoms can be cured by taking anti-allergics, however, not all allergies can be cured. So the main problem arises is how to deal with such allergic diseases and its symptomatic appearance.

Therapeutic strategies have come forward to help relieve the allergic symptoms. These strategies aim at understanding the cellular and molecular mechanisms of the disease and develop methods for possible intervention of the pathway(s) that causes allergy. The ultimate aim remains to reduce the symptoms that arise due to allergen triggers and inflammation. Several therapeutic strategies have been adopted either to mitigate the allergy symptoms or to bring about a tolerance towards the offending allergen. The preliminary and the simplest method involve allergen avoidance. Some allergy symptoms improve with the home treatment and/or changing the lifestyle. A simple method involves avoiding the known triggers. For instance, if one is allergic to pollen, then it is recommended to stay indoors with windows and doors closed during seasons when pollen is high. Beddings and stuffed toys should be frequently washed in hot water to reduce exposure to dust mites and animal dander. Similarly, carpets and other flooring mats should be regularly cleaned using a vacuum cleaner. Maintaining low humidity, reducing moisture in damp areas such as bathrooms and kitchen areas by using ventilation fans and dehumidifiers helps reduce probability of developing mould and insect allergy. This treatment method is however, rarely complete either because it is not possible to avoid the allergen completely or because it needs several days or even weeks for this method to be effective.

Pharmacotherapy forms the second line of therapeutic treatment that involves a vast array of strategies and therapies for managing allergic diseases. It involves administration of inhaled corticosteroids that function by activating cytoplasmic glucocorticoid receptors and modulating transcriptional activity of target genes. However, their clinical efficacy is often accompanied by acute and chronic adverse

effects. Bronchodilators are recommended either singly or in combination, where symptomatic management is needed and is commonly used in cases of asthma. They directly act on airway smooth muscle cells, causing them to relax. Then there are anti-histamines, which comprises of one of the earlier methods for the treatment of allergic diseases. The earlier forms of anti-histamines, though effective, had some of the major limitations such as sedation and cardiac toxicity. The new generation anti-histamines are however, quite potent and without any adverse or harmful side-effects. These are often used in combination with a



decongestant to relieve congestion. Different anti-leukotrienes are also used to bring down the symptoms of allergic diseases. These function by inhibiting the synthesis of leukotrienes which are lipid mediators responsible for causing inflammation and subsequent allergy. Also, there is anti-cytokine therapy that aims at developing receptor-specific blocking antibodies to inhibit cytokine binding to its receptor and thereby block the downstream signalling leading to allergic inflammation. Despite several pharmacotherapeutic strategies available, management of allergic diseases by these methods is marked by the relapse of symptoms once the drug is discontinued. This calls for additional pharmacotherapy.

The third line of therapeutic strategy is allergen immunotherapy. It is an immunomodulating therapy that is highly recommended for treatment of allergic rhinitis, asthma and drug allergy. Specific immunotherapy involves administration of increasing quantities of allergen extracts during an up-dosing phase followed by

repeated injections of the allergen at a maximum tolerated dose for a period of 3-5 years. The administration of the allergen can be done by subcutaneous, sublingual, oral, nasal or lymphatic routes. Continual allergen exposure induces tolerance and production of blocking IgG4 antibodies. Allergen immunotherapy is clinically proven to provide long-term clinical benefits, including symptomatic disease remission and also reduction in allergic disease progression. Allergen immunotherapy shows long-term effectiveness in symptom reduction more than 3 years following treatment cessation and also prevents the development of new sensitizations. Despite its proven efficacy, the decision to proceed with allergen-specific immunotherapy should be made on a case-by-case basis, taking into account individual patient factors such as the degree to which symptoms can be reduced by avoidance measures and pharmacological therapy, the amount and type of medication required controlling symptoms and patient preferences. Since immunotherapy carries the risk of anaphylactic reactions, it should be prescribed only when the other strategies fail to work and should be performed by physicians who are adequately trained in the treatment of allergy. Also, the safety of the allergen extracts needs to be tested prior to its use.

Thus, a lot of work still needs to be done in order to develop and standardize allergen extracts that are not only effective but also safe for use in immunotherapy to ameliorate allergic diseases. Also, novel strategies need to be developed that can avoid the risk of anaphylactic reactions during the treatment.



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MAL'ARIA, “BAD AIR”-A DEADLIEST FOE



We have always been asked to avoid stagnation of water as standing water is a reservoir for mosquito breeding. One such mosquito is *Anopheles* responsible for the transmission of noxious and oldest foe, malaria that takes millions of lives each year. It begins with a bite, a painless one by the female mosquito (since they need Hemoglobin to nourish eggs) and transmits into the human system, an apicomplexan protozoan parasite- *Plasmodium*, the major culprit associated with the disease. Although five *Plasmodium* species are known to cause malaria in humans, yet *P. falciparum* is the deadliest of all as it replicates rapidly in the blood. *P. falciparum* is responsible for about 90% of deaths due to malaria worldwide. It makes the Red Blood Cells (RBC) sticky which then gets stuck in the blood vessels while passing through the organs. With the increasing number of RBC's, blood flow to the organs reduces and if this occurs inside the brain, the nit causes cerebral malaria which leads to impaired consciousness, coma and even death. Other complications of *P. falciparum* infection include renal failure, hemoglobinuria, non-cardiogenic pulmonary edema, profound hypoglycemia, acute respiratory distress syndrome (ARDS). This obligate intracellular parasite has an extensive transcriptional regulation facilitating its life cycle progression, host-parasite interaction as well as responses to external stimuli. Its epigenetic makeup is unique as its epigenome is mainly euchromatin indicating its dynamic state. It

is like the thieves were already under the bed when the alarm sounded: The parasites swiftly invade a new set of blood cells, and the sequence of reproduction and release continues rapidly. Prognosis, in case of *P. falciparum*, is excellent with early diagnosis and proper treatment but if untreated carries a poor prognosis with a high mortality rate.

P. vivax, however causes benign tertian malaria as parasite forms hypnozoites and stays dormant in liver from days to years causing no symptoms thereby remaining undetectable during blood tests. These hypnozoites allow it to survive in temperate zones where mosquito breeding occurs once a year.

P. malariae causes quartan malaria. It has low morbidity rates as compared to the former two. Another less dangerous species is *P. ovale* which is rare and causes tertian malaria in humans. Its two subspecies- *P. ovalecurtisi* and *P. ovalewalliker* has recently been identified. Fifth *Plasmodium* species- *P. knowlesi* had been known to cause malaria in monkeys but has recently identified to infect humans also.

Now from a wealthy country's vantage point it may not seem like that but we live on a malarious planet as malaria is still a major problem in about 91 countries threatening nearly half the world's population. Moreover, emerging drug resistance of *Plasmodium* has played an essential role in the severity of

the disease. Artemisinin combination therapies (ACTs) have become the cornerstone of the treatment of *P. falciparum* throughout the malaria endemic world but the emergence and geographic spread of artemisinin resistant *P. falciparum* represents a serious threat to global malaria control and the aspirations to eliminate malaria. Consequently, several promising new antimalarial drugs are in the pipeline. Several medicinal plants are being tested for potential antimalarial components. New antimalarial targets inside the parasite are being identified. Recently, it has been identified that tablets made from dries leaf of *Artemisia annua* is able to inhibit drug resistant strains.

If we look at vaccine development it would provide a lifelong protection but it is fiendishly difficult to create one as *Plasmodium* is much more complex than viruses and bacteria. Now *P. falciparum* has countless strains and a vaccine is supposed to block all of them without leaving any opening for the parasite to develop resistance. Creating a malaria vaccine is one of the most ambitious medical quests of all time.

Although some countries have been able to eliminate malaria and there is 21% reduction in malarial cases between 2010-2015, current tools and treatments are insufficient to achieve eradication of malaria in many countries. Therefore, every effort needs to be made to develop new strategies and drug regimens in order to halt their spread and accelerate their eradication.



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NURTURING AT AIVI'S NEST: SUCCESS STORY

HOPES TURNED TO REALITY: GETTING AWARDED WITH PRIME MINISTER'S FELLOWSHIP FOR DOCTORAL RESEARCH

I started preparing for GRE, TOEFL and IELTS in the year 2012 with a desire to get admission in Ph.D, Immunology from a reputed International University. But admissions abroad has its own pre-requisites - finance, publications, research component etc. Most aspirants give up because the competition is cut-throat, and a successful completion doesn't promise a great career. But this doesn't infer that someone is choosing ease and material benefits over education, but rather speaks of societal pressures to poseas standalone and start earning.

When I couldn't get through these entrance exams, I planned to offer tuitions to school children. I also attempted few more stints in some mid-market firms until I realized that it was not my walk of life. I was teaching Biology in a school, when I appeared for entrance examination for PhD in Immunology at Amity Institute of Virology and Immunology. I left the job in order to focus on the course and simultaneously kept trying for different fellowships. I tried ASTIF (Amity Science, Technology & Innovation Foundation), CSIR-NET, ICMR, etc. but didn't get through them. But I didn't let these, demotivate me.

I consulted my Ph.D Guide, Dr Premlatha Martha and Advisor, Prof. Narayan Rishi for some feasible options. Dr Martha introduced me to my co-guide, Dr. Manoj Kumar Chhikara, Director (R&D), MSD WELLCOME TRUST Hilleman Laboratories. Prof Narayan Rishi acquainted me with the Prime Minister's Fellowship. I enquired about it from seniors in the Department, but was constantly being made aware of this fellowship happening next to impossible. There were discouragements coming my way, still I started my project conceptualization at Hilleman labs and Dr. Manoj helped me with the synopsis.

My research project

My Doctoral research work is on the Development of Immunodiagnostic assays of Meningococcal antigens which would be useful in vaccine development. This concept was formulated into a project with an intention to solve immunity challenges for the public. It carried a strong quotient of industrial relevance too.

Among the major bacterial diseases globally, Meningococcal diseases caused by *Neisseria meningitidis* serogroups contribute in a sizeable manner to the mortality rates, especially in Sub-Saharan African Meningitis belt. The awareness around Meningococcal disease epidemiology in most Asian countries (including India) is scant, and that undermines



the potential risk and burden of the disease. Currently available multivalent vaccines against Meningococcal diseases are mostly conjugate vaccines which are very expensive, making it almost out-of-reach for the majority population in developing economies.

Need of the hour was the development of a low cost multivalent Meningococcal conjugate vaccine derived from chemical coupling of antigenic bacterial PolySaccharides (PS) to T-cell dependent carrier proteins which are effective in all age groups. The development process includes bacterial PS production by fermentation, its downstream purification, conjugation of PS to a suitable carrier protein to produce a monovalent conjugate bulk, and combining conjugate bulks of various serogroups to develop a multivalent vaccine for pre-clinical and clinical evaluation. Immunoassays are required to identify and estimate the amount of polysaccharide present in the sample during this whole development e.g. during fermentation, purification, conjugation and in the preparation of the stable multivalent vaccine formulation. Due to the lack of any commercially available test, developing these assays e.g. competitive inhibition ELISA etc. and their qualification is quite important part of the whole Meningococcal vaccine development. The assays will also

be required for release of vaccine for sale after vaccine licensure.

Thus the project aimed to develop and qualify the required ELISAs for serogroup A, C and X of N. Meningitidis which not only will support the ongoing vaccine development but also will become base for the indigenous diagnostic tests for Meningococcal infections in clinical settings, and help in evaluating the actual burden of the Meningococcal disease in India.

Project screening and result announcement

The Prime Minister's Fellowship Scheme for Doctoral Research is a Public-Private-Partnership (PPP) between Science & Engineering Research Board (SERB), Department of Science and Technology (DST), Govt. of India, and Confederation of Indian Industry (CII). The scheme awards 100 'Doctoral Research Fellowships' every year in the field of Engineering and Life Sciences. It's aimed at encouraging scholars to take up industry-relevant research. One half of the scholarship is provided by the government and the second half comes from a partner company.

The selection committee was chaired by Dr M K Bhan, Former Secretary, Department of Biotechnology and representatives from both industry and academia.

When the results were out, I found my name on the top of the list. I bursted out with tears and was speechless for hours. My efforts of so many years had finally been paid off. From that moment, I believed that one should never give up hopes. One never knows whether his/her "Pursuit of Happiness" is just few steps ahead or more.

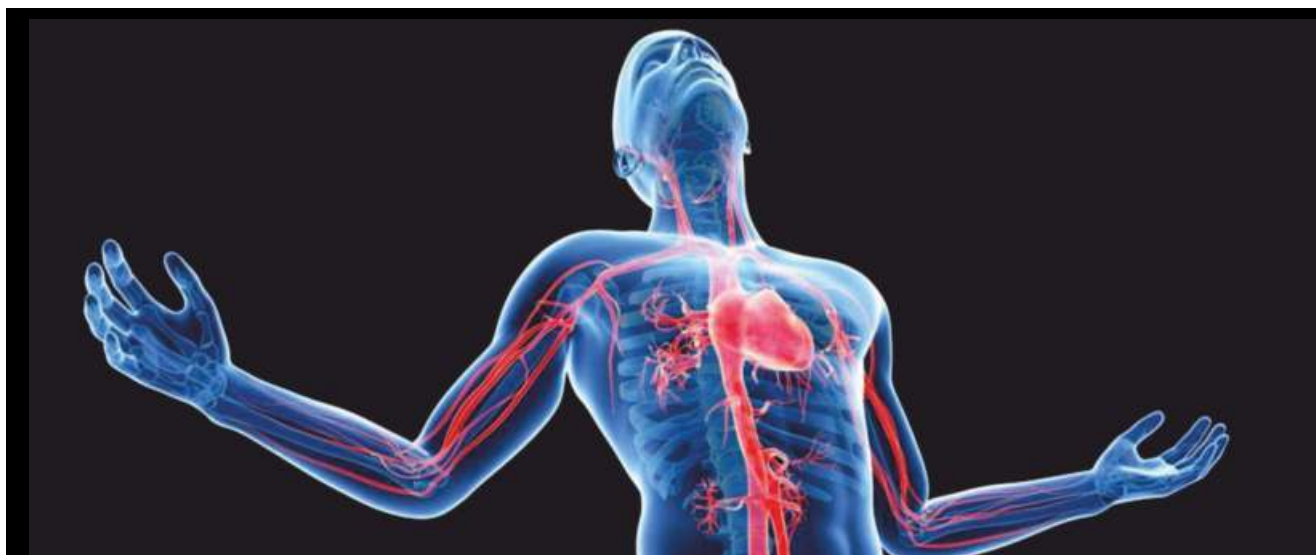
My responsibilities have increased from that day, and so is my motivation and focus. I have to work hard to be successful and to keep high, the name of people and organizations who supported me throughout this journey.

I am extremely thankful to Prof. Narayan Rishi, Dr Martha Premlatha, Dr Manoj Kumar Chhikara, Dr Davinder Gill and Prof. (Dr) W. Selvamurthy for their guidance and kind support.



Ms. Nitya Sharma
PhD Scholar (Immunology)
Amity Institute of Virology and Immunology, Amity University
Uttar Pradesh, Sec-125, Noida.

DIL DHADAKNE DO...



Roshan was a dedicated taxi driver and used to ferry school kids. A happy-go-lucky and God fearing person, he also had huge expectations from life. But fate had it otherwise. Few days back he died of heart attack and is survived by his wife and 3 young kids. Roshan was just 38 years old.

Roshan's case is nothing unusual. Almost 2 million instances of heart attacks are reported every year in India. Approx. one person dies every 33 seconds due to heart disease. Men living in cities are three times more prone to heart attacks than people living in villages. All these and many other statistics outlined in a recent survey point towards one of the most rapidly rising health concerns being faced by the country today. Making the scenario even worrisome is the fact that youngsters constitute a significant percentage of these cases.

Unfortunate, but true.

Our current hectic lifestyle, sedentary health profile, poor dietary habits, fiscal pressures and other stress factors, are some of the key reasons contributing to this trend. Further adding to the rate of mortality cases is lack of early detection and more so inability of people to afford medication or seek treatment to cure heart diseases.

Given the background, the government has reduced prices of coronary stents by up to 85 per cent. The National Pharmaceutical Pricing Authority (NPPA) in a notification

said in public interest, it has fixed the ceiling price of bare metal stents at INR 7,260 and that of drug eluting stents and bioresorbable vascular scaffold (BVS)/biodegradable stents at INR 29,600.

The increase in the number of patients suffering from heart diseases directly translated into huge margins for hospitals. No wonder even mid-rug hospitals today have facilities to take care of cardiac patients. Validating this fact is the data available at NPPA website which shows that hospitals make the maximum profits on stents, with trade margin going up to 654 per cent.

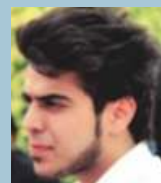
The government had included coronary stents in the national list of essential medicines (NLEM), 2015 in July 2016 and in the first Schedule of the Drug Prices Control Order (DPCO), 2013 in December 2016.

Citing the reasons for its order, NPPA said: "...it was found that huge unethical mark-ups are charged at each stage in the supply chain of coronary stents resulting in irrational, restrictive and exorbitant prices in a failed market system driven by information asymmetry between patients and doctors pushing patients to financial misery". Undoubtedly, margins of 645 per cent are beyond one's imagination.

Thanks to the welcome move made by the government now many people will be able to use stents and save the life of their loved ones in case of a stroke.

But one question that looms large is that how many people will actually have an access to this information? How many hospitals will go on record declaring the government's order? How many people on their death beds after a coronary attack will actually benefit from this move?

Well, all we can do is simply hope that a sizeable chunk of affected people get a new lease of life from availability of affordable stents. While government has taken a crucial step in supporting patients suffering from coronary diseases, ever wondered about the plight of those who are a prey of many such other life threatening diseases? They are still hoping to afford the desired medication. They are still running pillar-to-post in search of a cheaper clinic or medical aid.



Mr. Karan Vohra
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KNOWLEDGE DISSEMINATION

ENVIRONMENTAL EFFECTS ON GENE EXPRESSION IN HUMANS

The expression of genes in an organism can be influenced both by its internal and external environment. Many a times, external environment affects the internal environment which in turn influences the gene expression. An example of this is, hormonal imbalance of testosterone in women. Increase in testosterone levels in women may be due to external factors like stress which in turn may lead to expression of certain male traits like balding in females.

The environmental effects on gene expression in humans was studied by Mario F. Fraga and his colleagues, at the Spanish National Cancer Centre. They studied ‘Epigenetics’ arising from non-genetic influences to identify factors responsible for gene expression in twins. 160 monozygous twins ranging from the age of 3 to 74 years

were taken for the study. They analysed two epigenetic phenomena along the entire genome and compared the results for each set of twins.

The researchers observed that early in life, some twins were indistinguishable in the manner in which their genes were expressed. However, among older sets of twins, significant differences in the gene expression portraits were apparent. Also twins who had spent most of their life apart from each other and had more divergent medical histories, exhibited many differences in the expression of genes. This was inferred to be a result of environmental factors like smoking habits, physical activity and diet. An example to understand this happening is that may be twins with smoking habits will not be as resistant to

lung diseases in comparison with the twins who does not smoke even though both have the same genes. Thus external environment may influence the translation of the same genotype in different ways.

To conclude, phenotype of an individual is determined by genotype or the type of gene expressed and these changes occur in individuals when exposed to external environmental factors.

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INTERNATIONAL & NATIONAL REPRESENTATIONS

Our eminent faculty, Dr. Vanita Chandel, Assistant Professor-II, had the opportunity of presenting her research work in the form of the poster during the **8th International Geminivirus Symposium & the 6th International ssDNA Comparative Virology Workshop from 7-10 November, 2016**. The work was appreciated by different workers around the world. The theme of the Symposium was specific to Geminiviruses, hence researchers around the world were under one umbrella and it was good platform for elaborative discussions. Around 65 delegates from abroad and 200 from India including students attended the symposium. Through the symposium, Dr. Chandel learned about people around the globe working in the same field and about the incipient findings taking place in Geminiviruses research. Since Dr. Vanita teaches plant virology courses and also guides PhD students, she found the symposium useful and a knowledge gaining experience. She also got chance to interact with many senior researchers and young scientists working in the area, few to denominate are; Dr. Bruno Gronenborn (France), Dr. Elvira Fialo-Olive (Spain), Prof. H. S. Savithri (India) and Dr. Rob Briddon(UK). The poster details are as follows:

Aruna Jangid, **Vanita Chandel**, Yogesh Kumar, Narayan Rishi. “Suppressors of RNA silencing encoded by velvet bean severe mosaic virus”

Dr. Chandel’s Ph.D. Scholar, Mrs. Renuka Sharma, had also presented her work as poster presentation. The details are as follows:

Renuka Sharma, Vanita Chandel, Pradeep Sharma, Narayan Rishi. “Amaranthus and Verbisina new hosts of Croton yellow vein mosaic virus.”



Dr. Vanita Chandel also had the opportunity of attending yet another **International conference on global perspectives in virus disease management “VIROCON 2017” from 8-10 December, 2017**. The conference was organized by the Indian Virological Society at Indian Institute of Horticulture Research, Bangalore. It was a good platform where virologists of different fields; Plant, Medical and Veterinary discussed and presented recent findings in their areas. The presentation details are as follows:

Shikha Dhatwalia, **Vanita Chandel**, Narayan Rishi. “Cowpea mosaic virus detected on cowpea by RT-PCR from Eastern UP”.

Dr. Chandel’s Ph.D. Scholar, Mrs. Renuka Sharma, had also presented her work as poster presentation. The details are as follows:

Renuka Sharma, Vanita Chandel, Pradeep Sharma, Narayan Rishi. “Begomoviruses detected in chilli and ageratum growing near chilli field.”

INTERNATIONAL & NATIONAL REPRESENTATIONS

- Dr. Shuvomoy Banerjee, Assistant Professor-II, had the privilege of attending the 21st World Congress on Advances in Oncology and 19th International Symposium on Molecular Medicine organized by Spandidos Publications at Metropolitan Hotel, Athens, Greece, from 6-8 October, 2016. The three days event covered the keynote address, plenary and invited lectures from renowned scientists and academicians along with oral and poster presentations by students. The conference organized the lectures related to



advances in cancer research and recent therapeutic trends in molecular medicine provided an excellent platform to keep up with the cutting-edge research as well as information exchange and networking among researchers, faculty members and eminent scientists all over the world. Dr. Banerjee, was an invited speaker from Amity Institute of Virology and Immunology (AIVI), Amity University Uttar Pradesh. He presented his research work related with tumor virus mediated deregulation of cellular kinases in human malignancies. Gammaherpesviruses have major contribution in the current concepts of cancer biology, specifically Epstein-Barr virus (EBV) and Kaposi's sarcoma-associated herpesvirus (KSHV) are associated with a wide range of human neoplasia. Oncogenic signals mostly involve activation of different cellular kinases. The studies undertaken by him provides novel insights into cellular oncogenic kinase-targeted therapeutic intervention strategies for gammaherpesvirus-associated cancers. The work was well appreciated by several scientists as well as conference organizing committee. The presentation details are as follows:

“Gammaherpesvirus-mediated deregulation of cellular kinase signalling in cancers”.

One of our Ph.D. Scholar's, Mrs. Anita Kumari had the privilege of presenting her research work at Post Graduate Institute, Chandigarh, during the 13th FIMSA Advanced Immunology Course held from 17-19 March, 2016. She was awarded with the Travel grant by the Federation of Immunological Societies of Asia Oceania (FIMSA). The presentation details are as follows:

Anita Kumari, K. Natarajanseenivasan, M.M. Premlatha. “Comparative analysis of r LipL21 and its truncated N-terminal region (rI-LipL21) as a sero-diagnostic antigen in IgM ELISA to detect Leptospirosis

- Our Post Graduate students had the opportunity of attending a Five day workshop from 20-25 February, 2017 on “Post-Transcriptional Control of Gene Expression in Eukaryotes” organized by Guru Nanak Dev University, Amritsar in association with the Global Initiative of Academic Networks (GIAN). The workshop was sponsored by Ministry of Human Resource Development, Govt. of India. Prof Arthur Hunt from the Dept. of Plant and Soil Sciences, University of Kentucky, Lexington, USA along with Prof. Pratap Kumar Pati, Dept. of Biotech, GNDU, Amritsar mesmerized the students with their scientific talks and energetic discussion. The main focus of the workshop was on how the Eukaryotic genome is modified after transcription and its importance. The students also acquainted themselves with techniques like High-Throughput Next Generation Sequencing, Ion Torrent Sequencing, From the Advisor's Desk.

- The last two semesters have seen some hectic activity with the institution growing in all departments. Four new faculty with stellar backgrounds have joined us adding new dimensions to the overall specialist portfolio of the department. The under graduation programme in life sciences also took off sprightly with 30 brilliant and energetic students. The life sciences programme is a key gap that is filled in the overall basket of options that AUUP offers. While allowing the students to establish their foundations in all subdivisions of biology, it prepares them for their future to specialise in any area of their choice at Master's level. Genomics has fast grown as a science over the last decade or so. Keeping in mind the growing need for specialized technical personnel in this area, a master's programme in genomics was also introduced.



- We love it when our students work hard, give their best shot and come out as achievers. And we believe their achievements will inspire many more to reach their goals. Our Ph.D student Nitya Sharma's project on meningococcal vaccine production in collaboration with MSD Wellcome Trust Hilleman Laboratories was selected for the Prime Minister's Fellowship award to the student. The Sanghatan saw our undergrad student Aprajita Jha win Silver in the 200 m running event. Palak Malhotra topped her class in the MSC

Immunology programme. We are proud of your achievements and hope that you will win many more laurels in the future.

- In the past year, the faculty of the institution published ---- articles in leading journals, presented ---- papers in national and international conferences. Two externally funded projects also were obtained.



- SOLiD Sequencing etc. Representatives from Bio-RAD were there to introduce a new PCR concept known as ddPCR (droplet digital PCR) requiring preparation of fine droplets, each representing a single PCR reaction. Besides this, our students also learnt RNA interference and its application in crop improvement. The workshop witnessed 100's of students from all across the country.
- Dr. Prashant Kumar, Assistant Professor, had the opportunity of participating in one month training on "Molecular virological techniques for Dengue & Chikungunya" at National Institute of Virology, Pune from 13th February-10th March 2017. The training involved a wide array of lectures with special focus on epidemiology, diagnostic techniques, prevention and management of dengue and chikungunya. Hands-on sessions involved serological techniques, cell culture maintenance and its inoculation with virus, virological detection assays, molecular diagnostic techniques and basic bioinformatics. The training also included field trips for mosquito collection and exposure to labs for handling and maintaining mosquitoes for study on dengue and chikungunya. I could develop contacts with eminent scientist at NIV, Pune and other participants of the workshop which is going to help me in development of collaborative projects. The workshop was indeed a successful event.

He also had the opportunity of attending a workshop entitled "Application of Bioinformatics Tools and Databases in Virus Genomics and Evolution Research" organised by the Desert Medicine Research Centre (DMRC), Jodhpur, Rajasthan from 17 to 18 March, 2017. This was again a fruitful workshop for me as I could get an exposure on the application of bioinformatics for various research purposes.

RECOGNITION AT INTERNATIONAL & NATIONAL LEVELS



The AIVI family is blessed and proud to have our Advisor, Prof. Narayan Rishi, been nominated as an Eminent Agricultural Scientist to the Academic Council of Dr. Rajendra Prasad Central Agricultural University, Pusa, Dist. Samastipur, Bihar for period of three years.

Prof. Rishi, has also been assigned as reviewer to evaluate the research project proposals submitted to European Union for funding.



Dr. Devinder Toor, Assistant Professor-II, has been assigned as reviewer to evaluate the research project proposals submitted to Auckland Medical Research Foundation, New Zealand for funding.



Dr. Nandlal Choudhary, Assistant Professor-II has been awarded a research project from Science and Engineering Research Board (SERB), Department of Science and Technology, New Delhi to work on Citrus virus. His research mainly focuses on molecular studies of Indian Citrus Ringspot virus (ICRSV) of Punjab isolates which are responsible for loss of quality production of kinnow mandarin oranges. The incidence of ICRSV has been reported upto 100% from citrus orchard of Punjab and other Northern Indian states. Dr. Choudhary will be studying the host defense suppressor molecule of ICRSV with which this virus able to infect the citrus. Dr. Choudhary will be also preparing polyclonal antisera against the recombinant protein of ICRSV. The developed antibodies will be utilized for conducting survey for the presence of ICRSV in Citrus orchards of Northern Indian states. The generated data will be helpful for the grower to plan the effective management strategy to control ICRSV.

EXPANDING SPECIFIC ACADEMIC ARENA



B.Sc. (H) LIFE SCIENCE

After introducing specialized Masters level programs in Virology, Immunology & Genomics, there was a need to introduce these courses at undergraduate level too so that students can get exposure to these specialized research oriented courses. The main aim to introduce the Life Sciences Program was to allow students to shape their own edification according to their categorical intrigues. This program provides multiple opportunities for students to explore the numerous facets of science. The courses offered within Life Sciences are designed to challenge students to cerebrate beyond the traditional disciplines of science and enhance their quandary solving skills. A Life Science student will be well rounded in both empirical cognizance and technical skills to further scientific investigations and revelations. This course will provide students, a platform where they can decide categorical courses they opt to take during higher academic edification as they are being exposed to fundamental understanding of life sciences courses. An undergraduate degree in Life Sciences will prepare students to incorporate erudition from the multidisciplinary fields of biology, chemistry, biochemistry, genetics, environmental sciences, and categorical fields of virology, immunology and genomics. The prodigious amount of information from these disciplines will provide students a vigorous background to approach scientific research from a directed and holistic perspective.

M.Sc. GENOMICS

We have introduced M.Sc. Genomics program to generate well-trained professionals in the area of human/ plant genomics who can be deployed in teaching and research institutes, pharma industry, diagnostic labs, seed and plant industry etc. Genomics is the study of the functions of the genes of a single cell which has great potential in medicine and molecular biology. Genomic research projects over the last few decades lead to several areas in the study of genomes such as human genomics, bacteriophage genomics, metagenomics, cyanobacteria genomics, phylogenomics, pharmacogenomics, proteomics etc. Knowledge of full genome sequences has become indispensable for biological research. These databases have a number of applied values in diagnostics, forensic science, systematic studies and biotechnological applications, etc. Till date, the whole genome sequencing of over 2,700 viruses, more than 1,200 bacteria and archaea and 36 eukaryotes including Human have been done. The genomic analyses of these DNA sequences generated the highly rich cluster of data which is useful to determine the relationships between the genes and different sections of DNA which in turn allows them to determine, which areas could offer benefits to science as well as mankind.



BOOK CHAPTERS

Dr. Nandlal Choudhary along with Prof. Narayan Rishi has contributed a book chapter titled “Transboundary diseases and pests and their impact on agriculture and agroforestry” in the Book: Plant Pathogens and their Management which has been published by Aavishkar Publishers, Distributors, Jaipur Rajasthan, India.

Dr. Devinder Toor and Dr. Shuvomoy Banerjee contributed a book chapter titled “Impact of stress on aging: an overview” in the Book: Ageing in India; Challenges and Changes which has been published by ABIPublishers, India.



AIVI'S ACHIEVERS



ACADEMIC EXCELLENCE

With due respect, I would like to thank the entire Department of AIVI for providing me such an interactive platform that most of my questions were answered exquisitely by each and every faculty member. I am blessed to be a part of this institute which helped me shape my future to the best of my knowledge. With continuous support of Prof. Narayan Rishi, Advisor of AIVI along with all the faculty members, I was able to strengthen my knowledge and receive the award of University Topper. The basics that I read in my graduation were actually practically performed here. A special thanks to Dr. Archana Ayyagari, Associate Professor, Swami Shradhanand College, University of Delhi who taught me so well that I chose immunology as my field of Science. It is because of her that I took admission in this wonderful institute.

Lastly, I would like to thank my parents and brother for their never ending love and support. I am blessed to be a part of this family.

Sincerely,
Ms. Palak Malhotra

SPORTING POWER

Besides concentrating on studies, our students also participate actively in extracurricular activities hosted by Amity. Ms. Aprajita Jha, B.Sc. (H) student was felicitated with silver medal for standing second at the 200 metres athletic race held during the 'Sangathan 2016' event.



INCULCATING HUMAN VALUES

VISIT TO ORPHANAGE



Human values are integral to any person's life that shape interactions with the society at large. As our institutional responsibility, to sensitize our students to human values, a visit to an Orphanage was scheduled on the 7th of April, 2017. Our Advisor, Prof. Narayan Rishi, Deputy Director, Prof. Vinod Joshi along with faculty members Dr. Shweta Dubey, Dr. Vanita Chandel, Dr. Devendra Toor, Dr. Somnath Pai and Dr. Naveen K. Kaushik accompanied the group of our B.Sc (H) Life Science students to the orphanage. The students included coordinators Ms. Harshikha, Ms. Sneha, Mr. Saubhagya and Ms. Mahima and Mr. Deepak who had helped them with arrangements for the activity. Sh. Deepak Sharma, owner of the Jag Shanti Udayan Ghar (Sector Gamma 1, Greater Noida) welcomed them and introduced them to 30 girls of the orphanage. Our B.Sc students gave a brief introduction of our Institute and its activities. This



was followed by a lunch and after that the students briefed them about health issues, how to maintain their personal hygiene, its relevance to human infections, and precautions and care needed in time of infection. The information was delivered in the form of charts which the students have prepared and carried along. The interaction left a deep impact on the students. We look forward to future interactions with these wonderful kids again.

WORKSHOPS

“Biorisk preparedness for handling potentially bio-hazardous materials in laboratory” at AIVI from 7-8th November, 2016.



AMITY INSTITUTE OF VIROLOGY & IMMUNOLOGY

Hosts

TWO DAYS WORKSHOP

on

“BIORISK PREPAREDNESS FOR HANDLING POTENTIALLY BIO-HAZARDOUS MATERIALS IN LABORATORY”

7th -8th November, 2016

REGISTRATION OPEN

Registration fee: Rs. 2000/-

Demand draft/Multicity Cheque in favor of:
Amity University Uttar Pradesh

Last date to apply:
October 31, 2016

APPLY
SOON
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“Hands-on training on cell culture techniques & Cytotoxicity assays” held at AIVI from 21st to 23rd March, 2017


 **AMITY INSTITUTE
OF VIROLOGY & IMMUNOLOGY**


PRESENTS

WORKSHOP ON

**HANDS-ON TRAINING
ON CELL CULTURE
TECHNIQUES AND
CYTOTOXICITY ASSAYS**

21st-23rd March, 2017 | Amity University, Sec-125, Noida (New Delhi NCR)

Indian Council of Medical Research 

 **AMITY
UNIVERSITY**



INDO-AFRICA TRAINING AT AIVI

Training on virus indexing and genetic fidelity testing of tissue culture plants for African candidates was organised. This training was funded and organised by BCIL and DBT. Candidates were from various parts of Africa such as Eritrea, Ethiopia, Kenya, Somalia, Sudan and Zambia working in various Govt organizations. Hands on training on virus indexing by serological and molecular techniques were given to the candidates.

Serological method such as ELISA was demonstrated by lectures and practical hands on by Dr. Vanita Chandel and PCR by Dr. Ashish Srivastava. In ELISA tissue culture raised banana plants were tested for Cucumber mosaic virus using antibodies specific to CMV. None of the plants were found infected. Tissue culture raised plants were also tested for Banana bunchy top virus using Polymerase chain reaction. But none of the plants showed infection. Candidates were also briefed about losses caused by viruses in plants and management aspects. Candidates were acquainted with other research facilities in the institute such as BSL II and other lab equipment.

All the African candidates enthusiastically learned virus indexing techniques. Sessions were also organised for discussion and queries. Overall it was very interactive training program.



The team with Instructors Dr. Vanita Chandel, Assistant Professor-II and Dr. Ashish Srivastava, Senior Scientist Grade-II.



Dr. Devinder Toor, Assistant Professor-II addressing the team introducing them to the Institute and its activities.



Dr. Ashish Srivastava providing hands on training to the visiting team



Delegates trying the experimental procedures independently after initial training.

UPCOMING EVENTS AT AIVI

III - HANDS-ON TRAINING ON CELL CULTURE TECHNIQUES AND CYTOTOXICITY ASSAYS

Date: 9th to 11th October, 2018

Limited Seats on first come first basis

For further information, contact:

Dr. Prashant Kumar @ 9911105935



AMITY INSTITUTE
OF VIROLOGY & IMMUNOLOGY

PRESENTS

LIMITED SEATS

WORKSHOP ON

HANDS-ON TRAINING ON CELL CULTURE TECHNIQUES AND CYTOTOXICITY ASSAYS

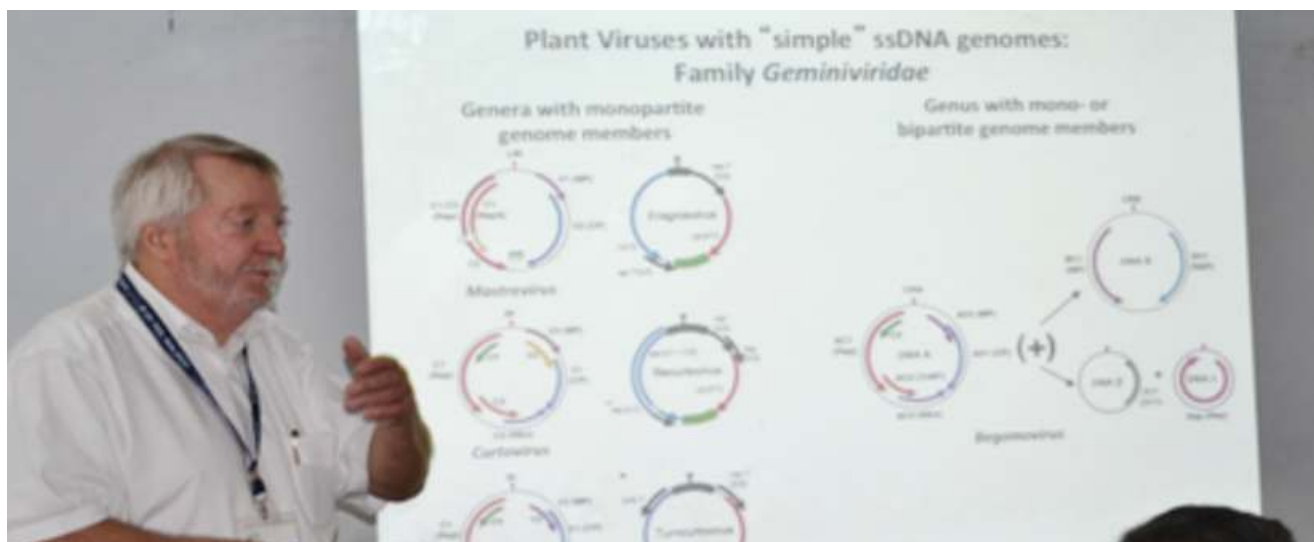
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GUEST LECTURES AT AIVI



Dr. Bruno Gronenborn, Institut des Sciences du Végétal, CNRS, France, delivering his lecture on “Single-stranded DNA plant virus replication: a retrospective” at AIVI. Dr. Gronenborn is a leading scientist in the field who the invented the “blue-white screen” technique that allows rapid and convenient detection of recombinant bacteria in vector-based molecular cloning experiments.



Dr. Rob Briddon, John Innes Centre, Norwich, UK delivering his lecture on “Cotton Leaf Curl Disease post-resistance breaking” at AIVI.



AMITY INSTITUTE OF VIROLOGY & IMMUNOLOGY

INVITES APPLICATIONS FOR:

- **B.Sc. (H) Life Sciences**
- **M.Sc. Immunology**
- **M.Sc. Genomics**
- **M.Sc. Virology**
- **M.Sc. Medical Microbiology (2 years + 6 months)**
- **Ph.D Immunology**
- **Ph.D Virology**
- **PG Diploma – Clinical Virology & Immunology**
- **PG Diploma – Plant and Seed Certification**

AMITY INSTITUTE OF VIROLOGY & IMMUNOLOGY (AIVI)

- Established to generate hardcore manpower in the field of Immunology, Virology & Genomics.
- Highly qualified faculty with Ph.D from premier Institutes/Universities with International Postdoctoral research/faculty/Industry experience.
- Research and Industry-focused curriculum based on research & technological developments in the field.
- Compulsory 6-8 weeks Summer Internship and 6 months dissertation training for M.Sc. Students at premier Institutes/R&D deptt. of corporates.
- Regular guest lectures by leading experts from India and abroad



ACHIEVEMENTS OF AIVI

- Over 60% students of M.Sc. Immunology and M.Sc. Virology have been selected for Ph.D. programmes in premier Universities/Research Institutes of India and abroad
- Ongoing research projects funded by DST, ICMR, DBT & CSIR
- National and International collaboration with premier Medical, Veterinary and Plant Science Institutes and R&D deptt. of corporates.
- Symposium/Workshop/Conference/Congress are regular features:
 - National Symposium on Immune Mechanisms
 - National Symposium on Influenza
 - Asia-Pacific Congress of Virology
 - Workshop on Molecular and Immunological assays
 - Workshop on Flowcytometry
 - Workshop on Q-PCR
 - Workshop on cell culture techniques and cytotoxicity assays

CAREER OPPORTUNITIES

Teaching, Research, Extension, Marketing etc. in Medical, Plant/Agriculture, Veterinary Research and Aquatic Institutes/Colleges, Corporates, Hospitals, Pathology Labs and Seed & Plant Companies.

ELIGIBILITY

Eligibility for B.Sc.(H): 12th with Biology as a subject with an aggregate of 60%.

Eligibility for M.Sc.: Graduation in Biotechnology/Microbiology/Biochemistry/Physiology/Botany/Zoology/Chemistry/Medicine/Dentistry/Ayurveda/Unani/Homeopathy/Naturopathy/Physiotherapy/Veterinary/Agriculture etc.

Eligibility for Ph.D.: Post Graduation in any subject of Life Sciences

FOR FURTHER DETAILS, CONTACT:

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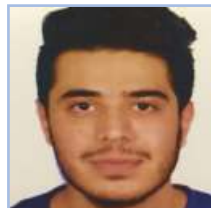


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