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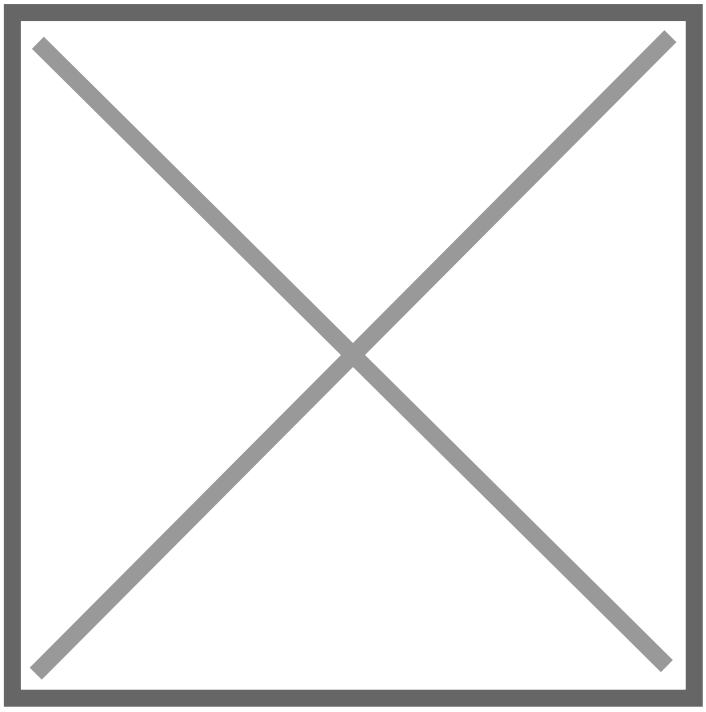

Prof. Veena Tandon is the ex-professor of Zoology, North-Eastern Hill University, Shillong. She now works as a Senior Scientist under the National Academy of Sciences India (NASI) Platinum Jubilee Scheme at Biotech Park, Lucknow.
Her research on worm infections has led to the better understanding of various kinds of parasitic infection in animals, particularly animals of food value, that can be transmitted to humans and helped doctors in better and efficient identification and treatment of worm infections.

Prof. Tandon did her PhD in Zoology (Parasitology) from Panjab University, followed by Post-doc at Department of Molecular Biology & Biochemistry, University of California, Irvine, USA.

After a brief stint at the Himachal University as Assistant Professor, Dr Tandon joined Department of Zoology, North-Eastern Hill University Shillong, as Assistant Professor, where she retired as Professor, recently, but continues to guide student as associated guide.

In her illustrious career, Dr Tandon held many prominent positions including member of Scientific Advisory Committee to the Cabinet, Govt. of India, headed by Dr APJ Abdul Kalam, Task Force of Department of Biotechnology, DST etc. among others.

Â **First of all, Many Congratulations on winning the prestigious Padma Shri Award. Please tell us about your research work. What do you want to achieve with your research?**
**Prof. Tandon:** During my long ( < 40 years) science and research career, I worked in the field of Parasitology, especially linked to the area of health and hygiene implicating worm infections that are part of everyday life. In Northeast India, in particular, these infections, especially of the liver, lung and intestine, are a potential threat to human health and affect a major section of the population via animal to human transfer as they are linked to socio-economic and socio-cultural factors- mainly hygiene and sanitation, traditional food practices and culinary habits of many native societies - in endemic areas.

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While surveying various animals of food value in that area, I could decipher the whole spectrum of worm parasites that exist in the northeastern region. I identified some worm infections, particularly parasites of lungs, liver and intestine that are transmitted to humans because of their preferred foods being shrimp, crabs, fish or in some places aquatic vegetation or contaminated water.These worm infections naturally occur in animals, fish etc. and through food the infective stages can enter humans and develop into full-grown worms and become problematic for them.

**What were the real world applications of your research work?**
**Prof. Tandon:** It was first to give the basic information about the kinds of (worm) infections that prevail in various groups of

animals. Narrowing down to those, which could have health implications for humans and to study their transmissions dynamics, i.e., how these infections are passed on from natural animal host to humans, what are the routes, which they take to reach human hosts. Humans may not be the primary host to these parasites; they get secondarily involved,when they share the same environment with the natural animal hosts and at times consume the animals that harbor the infective stages of these worms.

**Would you share with us a turning point or defining moment in your work as a scientist?**
**Prof. Tandon**: During my four-decades long research career, I could provide a complete spectrum of worm infections prevalent in animals of food value (e.g., livestock, poultry, frogs, fishes and crabs) in the northeastern region, and their implication to human health. The turning point as you say was when I diversified a little more, to find out markers for their diagnosis at the genetic level or at the molecular level using DNA-based techniques.

I say authentic diagnosis is important because in many areas where these infections prevail, the physicians may not be familiar with or aware of them and may not know what exactly is the cause of ailment in their patients.
I also got recognition when I worked with doctors form Arvind Eye Hospital, Madurai and identified the novel causative agent (worm) of granulomatous uveitis in children in Tamil Nadu and Kerala, South India.

Â Thus, using a range of approaches from empirical experiments to modern genomic technologies my research work has provided valuable information for use by the research community and society at large and a greater understanding of the etiology of food-borne tropical parasitic diseases, which is important for the development of interventions and effective control strategies.

**What is your favorite aspect of your research?**
**Prof. Tandon:** The flat worms (or the tremadotes and tapeworms) and roundworms (the nematodes). My involvement has been more to find the diversity of worms in different animals like fishes, frogs, reptiles, birds, mammals etc, finally narrowing down to humans. Because, many of these infections occur in humans and are categorized as 'neglected tropical diseases' (NTDs). This term is given by WHO, and a lot of attentions is being paid for control and prevention of these infections. NTDs are the diseases of the poor and usually occur in lower socio-economic groups, living in inadequate hygiene and sanitation conditions.

**Please describe your journey so far.**

**Prof. Tandon:** Initially, when I first started it was through surveys identification (or simple taxonomy) and distribution of the lowly organisms, worm parasites, among different groups of animals. From this entire spectrum of worm infections, potential infections of medico-veterinary significance could be revealed. Once I could pin point the infections that could prevail in humans the next thing was to know how the people in affected areas are handling such ailments. In the Northeast, as my experience goes, the different tribal people follow their own strong traditional medicine system; they depend on the plant-derived medicines to cure various ailments. Besides working on the biology and the epidemiology of worm infection, I extended my horizons towards screening those putative medicinal plants that are used by various tribes for curing worm infections. I extensively investigated the efficacy of many medicinal plants to scientifically authenticate their vermicidal / vermifugal potential. Such plant-based cures can offer valuable therapeutic alternatives of affordable healthcare to socio-economically underprivileged and rural societies.

For last several years I have been deeply involved in conducting science promotion and awareness programmes for school children in less privileged or facilities-deprived educational institutions in rural and remote areas of the northeastern states of the country.

Given the potential magnitude of these infections, my research has helped various native communities and has a far-reaching impact on society.

**Did you always want to become a scientist? What drew you to this field?**
**Prof. Tandon:** Oh, yes. My dream was to go into medical science. When I passed my +12, I was only 14 and half years old, and the cut off at that time for MBBS course was 17. So, the next suggestion in my family was to go in for animal sciences and then there was no looking back. I did my BSc, MSc, PhD in Zoology.
I was studying in Panjab University where as a convention the toppers would always choose Cytogenetics as their preferred specialization for MSc. Contrary to this, I opted for Parasitology as the main subject; there were not many students in this field.

**What are your thoughts on the quality of research stemming from India? Are there enough opportunities for researchers?**
**Prof. Tandon:** In Central Universities and National Research labs by and large the standard is good. The opportunities are many and the funding is also very good, which has increased several folds in recent times.

But in most state universities the standard is not all that good. For this, there can be many reasons- the selection process for faculty positions, financial crunch, lack of zeal or motivation among the younger generation, etc. In most institutions, particularly where there is not much of a competition, the teachers/researchers feel contended with mediocrity and bother more about their pay structure rather than their academic and research contributions.

**Do awards validate your research? Are they helpful in any ways? Does it make it easier to secure grants etc?**
**Prof. Tandon**: Sometimes recognition in early career could be helpful. But I think once you reach a certain stature, awards don't really matter. What matter really is the satisfaction you get form your work, seeing your students doing well etc.
For research grants, at the senior level it is the quality of your research work that is taken into consideration. Awards do add up to your reputation. But ultimately your research work and its relevance is what is more important for securing grants.

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