Evolution of a microbiologist to an e-Genomicist

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Microbiologists have dominated the Indian Science among the Biologists, after the classical Botany and Zoology were segregated into Microbiology, Biochemistry and Genetics. These three disciplines have re-converged to evolve as Biotechnology and more recently as Genomics. This made it necessary for scientists to change to cope up with the rapid developments that are taking place in these disciplines. Many Scientist might find it different but Dr. H. J. Purohit is one among those scientists who transformed from Microbiologist to e-Genomicist at National Environmental Engineering Research Institute (NEERI) Nagpur. He introduced the concept of molecular tools in Environmental issues. Dr. Purohit along with his group developed a rapid method to extract DNA of high quality (PCR compatible) from microbes present in water, soil and effluent treatment plants. Additionally, a protocol was developed for simultaneous detection of water borne pathogens such as *Escherichia coli*, *Salmonella* and *Vibrio*, the major cause of health problems in Indian population. The protocol for monitoring the biomarkers for tracking genetic loci in pathogens, the domain and jurisdiction of “Health”, was extended to the “Environment”. More than the health discipline, this issue has been shifted to discipline of Environment (contaminated environmental niches). Due to its importance, the

Department has been recently christened as Environmental Genomics Unit, EGU. From analyzing the biomass of Effluent Treatment Plants (ETPs) targeting wastes from pesticides, phenolics, petrochemicals, refineries, and to tools at metagenome level he also described the diversities in these systems, e.g. he demonstrated that with the variety of organic loading, an enormous microbial diversity could exist and sustain the performance in an ETPs. Dr. Purohit has used the concept of biogeochemical processes and blend it with the concept of Genomics to address Environmental Impact Assessment with a new approach.

In the area of metagenome based microbial community analysis from ETPs in India, Dr. Purohit has become an expert in the area of metagenomics. He is currently applying analytical skills by using statistical and computational tools to redefine the microbial diversity. The issue of “mismatching” in the 16S rDNA based taxonomy was also emphasized by him. He has used dinucleotide probabilities in gene sequences to discriminate the closely related genera. He used it for classification of microbes by selected distribution of tetra nucleotides 16S rDNA sequences picked by using principal component analysis. That monotonous looking nucleotide sequence had unique patterns and genus specific signatures were also highlighted by him. He along with his team used proteomic tools in cerebrospinal fluid samples from patients of Central India Institute of Medical Sciences (CIIMS), Nagpur to select biomarkers for the development of a diagnostic tool for TB causing bacteria *Mycobacterium tuberculosis*. In collaboration with the Institute of Genomics and Integrative Biology, CSIR, Delhi he has been instrumental in proposing new drug targets for *Mycobacterium*.

He used few verses from “Bruhat Samihta” to develop know-how for drinking water disinfection using clove oil and got couple of US patents. Presently, he is part of

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a screening project for bio-molecules for blood clot lysis with selected herbs based on “Ayurvedic knowledge” with CIIMS. The study has already resulted in an Indian patent.

Dr. Purohit has now published more than 80 research papers and has several patents to his credit. He is also teaching University students and training P. G. students in R&D. He has filed 11 patents, and has already been granted two US patents. He is presently a member of a number of decision

making bodies at different levels at Govt. & autonomous institutes and a “Fellow of Maharashtra Academy of Sciences”.

Dr. Purohit also aims to harness the hitherto unexplored microbial potential from diverse niches in India. He is currently coordinating a mega project along with fellow scientists from nine different institutes in India and an industry, M/s Nicolas Piramal, to search for new drug molecules from microbes collected from different environments.