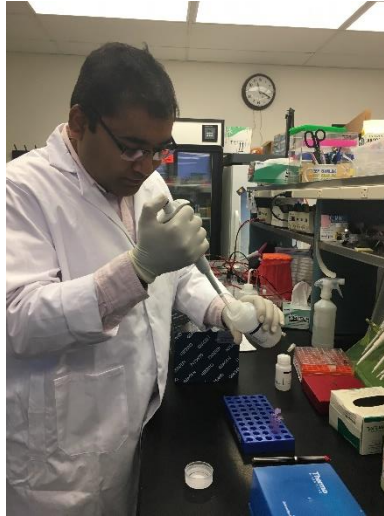


Visiting established scientist contributed to improving early detection of antibiotic resistance in bacteria

By Jordan Stidham



Through the U.S Department of Agriculture Agricultural Research Service Research Participation Program, Sushim Kumar Gupta, Ph.D., was able to utilize next-generation sequencing methods to control antibiotic resistance.

The number of multi-drug resistance pathogens is rising considerably and early detection of resistance patterns could be the key to combating this threat to human health.

Once the appropriate sequencing data are generated, new genes and potential mutations that carry antibiotic resistance (AR) can be predicted in minutes. AR is the ability of a bacterial pathogen to resist the effects of medication that in the past was effective in treating or preventing an infection. User friendly and stand-alone tools for the detection of AR pathogens could be helpful in early detection.

With an interest in bioinformatics and molecular microbiology, Sushim Kumar Gupta, Ph.D., applied to the U.S Department of Agriculture (USDA) Agricultural Research Service (ARS) Research Participation Program to expand his knowledge. The USDA ARS Research Participation Program provides opportunities for students, postgraduates, established scientists and faculty to participate in programs, projects and activities at ARS-designated facilities to help ARS solve agricultural problems of high national priority.

Once appointed to a USDA ARS program, Gupta and his mentor, Jonathan Frye, Ph.D., a research microbiologist for the Bacterial Epidemiology and Antimicrobial Resistance Research Unit (BEARRU), met frequently to discuss Gupta's progress. In addition, Gupta and his colleagues engaged in discussions about finding new ways to implement different tools for their research.

Gupta's research focused on the molecular characterization of AR in bacteria. He conducted analyses of the next generation sequencing (NGS) data from bacterial pathogens, such as *Salmonella*, *E.coli*, *Enterococcus*, *Campylobacter*, to decipher the genetic mechanisms of AR.

His research will aid in the development of better strategies to combat AR, while maintaining and improving animal health and ensuring safe food for consumers.

This experience has given Gupta confidence about his future endeavors and a better understanding of food pathogens, AR and NGS. He learned skills by creating and implementing various tools in NGS data for advance processing and developed skills that will be helpful throughout his career.

Gupta received his doctorate degree from the National Chemical Laboratory in Pune, India, and is seeking a permanent position at a research institute.

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