Application of Next Generation Sequencing in Fundamental and Clinical Sciences

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Next Generation Sequencing (NGS) has opened the floodgates on biological research in the recent years. Given its ability to interrogate entirely novel genomes, and the ability to aid novel discoveries in well-studied novel systems, NGS has rightly replaced microarrays as the preferred tool for high throughput biological discovery. There are many instances where high throughput sequencing has aided the both fundamental discovery as well as applied sciences. For instance, high throughput sequencing has allowed scientists to understand host specific evolution of uropathogenic *Escherichia coli*. Similarly, genomics has been used to understand the spread and evolution of the *Vibrio cholerae*. In the first part of my talk, we will see examples of how NGS facilitates the understanding varied biological questions: from plants, to non-model animals, to disease causing pathogens. In the second part, we see how NGS provides a way to understand regulatory networks in pathogens. Last, but not least, NGS technologies provide a window into the fascinating world of cancers. Cancers are diseases of the genome; a case of what happens when genomes go awry. NGS technologies let us have a glimpse of changes that happen within the cancer genome. In the third part of the talk, we will see examples of how NGS technologies lead to better cancer treatment.