

GLOBAL SUMMIT ON NEPHROLOGY, UROLOGY AND KIDNEY TRANSPLANTATION

September 18-19, 2023 | Webinar

Computational analysis of NGS data for prognosis of ovarian cancer

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Major cause of mortality in ovarian cancer is attributed to a lack of specific and sensitive biomarkers for diagnosis and prognosis of the disease. For highly recurrent tumor, the lifetime risk of the patients is as high as 1.3 %. The manifestations of the disease do not include specific symptoms at the initial stages. Though late-stage disease present certain symptoms they are often non-specific and the disease is diagnosed when it already shows metastasis. The treatment for the disease includes cytoreductive surgery and standard chemotherapy. Unfortunately, the tumor relapses within 2-3 years and the prognosis worsens leading to fatality. The analysis of Next Generation Sequencing (NGS) data for the identification of biomarkers has been found to be relevant in diagnosis and prognosis of cancer. The present work comprehensively focuses on identification of novel functionally damaging mutations in 6 genes from 13 ovarian cancer cell lines. The mutations identified were further validated with the wet lab experiments. For the first time we have reported damaging co-occurring mutations in one of the immune modulatory genes IL7R. Efficient machine learning classification models were also developed for the prediction of candidate driver genes of ovarian cancer along with a study of mutational landscape of ovarian cancer. It is envisaged that the work will lay the foundation for the development of novel biomarkers with potential application in molecular profiling and in estimation of ovarian cancer prognosis..

Biography

Dr Vyas has completed her PhD from premier CSIR NCL Pune and postdoctoral studies from University of Tennessee Knoxville USA. She has experience in academia, industry and reserach. She is the Head of School at MIT Bioengineering Insitute. She has published more than 40 papers in reputed journals, with 10 patents and 2 books by Springer. She possesses interdisciplinary knowledge in the fields of drug design, machine learning and bioinformatics. She is the recipient of several national and international fellowships and awards.