Seminars in Biotechnology BTEC 591 & BTEC 691

"Drug Repositioning for Efficient Cancer Therapy by the Employment of Systems Biology"

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Dr. Beste Turanlı graduated from Ege University, Department of Bioengineering with BSc degree. She got her MSc degree (2014) and PhD degree (2018) in Bioengineering under the supervision of Assoc. Prof. Kazım Yalçın Arğa from Marmara University.

During her graduate studies, she focused on biological networks for revealing the molecular mechanisms of complex diseases, identification of novel biomarkers and novel drug repositioning strategies. During her PhD education, Dr. Turanlı joined Prof. Adil Mardinoglu's laboratory in KTH (Stockholm, Sweden) as a TUBITAK Scholar. She employed genome-scale metabolic models for drug repositioning. She has published around 20 research and review papers in different journals including EbioMedicine, Frontiers in Genetics, Frontiers in Physiology, Chemical Engineering Journal and Seminars in Cancer Biology. Since 2012, she has been working as a research assistant in Istanbul Medeniyet University.

Abstract

Cancer as a complex disease is a global burden which is one of the leading causes of death, worldwide. Chemotherapeutic agents used for the treatment have notorious side effects that significantly reduce quality of life. Therefore, drug repositioning promises repurposed non-cancer drugs with little or tolerable adverse effects for cancer patients. Data accumulated by high-throughput screenings and advancements in computational biology methods have paved the way for rational drug repositioning methods.

This talk will focus on current drug-related databases, tools and the systems biology methods for drug repositioning. In addition to examples of mostly repurposed drugs for cancer treatments, we also mention the repurposed drugs from the recent studies by our research group. For example, zenarestat for prostate cancer and drugs including rosiglitazone, risperidone, clocortolone for head and neck squamous cell carcinoma treatment have been repurposed by using geneXpharma tool. Genome scale metabolic model for prostate cancer has been reconstructed to be used for repositioning and sulfamethoxypyridazine, azlocillin, hydroflumethiazide and ifenprodil have been reported as drugs with *in silico* prostate tumor inhibition effect. Furthermore, we defined a novel approach to identify breast cancer subtype-specific network modules via a network entropy-based approach. Drugs including 5-fluorocytosine, oxymetholone, oxaprozin, gestrinone and rilmenidine are repurposed for basal-like breast cancer.