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Protein Biomarkers for Diabetic Retinopathy using Data Mining Techniques

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Bioinformatics and sequence mining are the application and development of data mining techniques to solve problems by comprehending biological data. Sequence analysis is the most primitive operation in sequence mining techniques. Modern sequence mining research is specialized in analyzing sequential patterns which are relevant and distinct from one another and utilizing retrieved sequences similarity and distance between different protein sequences can be analyzed. In this study, Diabetic Retinopathy is the leading cause of blindness in adults with diabetes and it is frequently occurring complication of diabetes mellitus feared by many diabetic patients across the world. There are several proteins which are believed to be involved in diabetic retinopathy. We have evaluated such proteins which are likely to be part of diabetic retinopathy by utilizing multiple sequence alignment tool viz., Clustal Omega and designed a phylogenetic tree of multiple protein sequences obtained from National Center for Biotechnology Information (NCBI). Here data mining technique are called sequence mining plays a key role in extracting protein sequences from the database. Phylogram was constructed using Neighbor-Joining Algorithm in Sequence Mining approach. From the phylogenetic tree, it was recognized that cortistatin, vitamin-D receptor and somatostatin proteins have close connection with diabetic retinopathy. Molecular docking studies have also been performed which is the most extensively used method for the calculation of protein-ligand interactions. According to previous studies have role in diabetic retinopathy in the silico docking studies shows that four inhibitory compounds i.e., Quercetin, Kaempferol, Naringenin and Melicitrin interact with aldose reductase. It is likely that vascular endothelial growth factor, pro-inflammatory cytokines, advanced glycation end products and adhesion molecules, additionally assume a part in diabetic retinopathy. The final observations obtained using sequential mining techniques denotes that methods designed to standardize these protein biomarkers activities could be of significant advantage in the inhibition and treatment of diabetic retinopathy in era of new therapeutic interventions.

Biography

Hanuman Thota is a Professor, VR Siddhartha Engineering College, Vijayawada, India and Scientific Adviser, Pulses Group, Hyderabad, India. Dr. Hanuman Thota is a PhD degree holder in Department of Computer Science and Engineering, Acharya Nagarjuna University, NagarjunaNagar, Guntur, India. His involvement goes beyond the academe as he is also active in professional development activities and community development initiatives.

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