TargetScanHuman is a widely used bioinformatics tool and database that focuses on predicting microRNA (miRNA) target genes in the human genome. MiRNAs are small RNA molecules that play a crucial role in post-transcriptional gene regulation by binding to the 3' untranslated regions (UTRs) of messenger RNAs (mRNAs), which can lead to mRNA degradation or translational repression. TargetScanHuman helps researchers identify potential miRNA target sites in mRNA sequences and predict the regulatory roles of miRNAs in specific biological processes.

Key features and functions of TargetScanHuman include:

miRNA Target Prediction: TargetScanHuman uses a combination of algorithms and sequence analysis techniques to predict potential miRNA target sites within the 3' UTRs of human genes. It assigns a context++ score to each target site, which reflects the likelihood of miRNA-mediated regulation.

Conservation Analysis: The tool considers the conservation of miRNA target sites across multiple species, which can help identify evolutionarily conserved regulatory elements and increase the confidence in target predictions.

Seed Match: TargetScanHuman places significant emphasis on the “seed match,” which is a critical sequence region in the miRNA that is complementary to the target mRNA. A strong seed match is indicative of a potential regulatory interaction.

Database of Predicted Targets: TargetScanHuman maintains a comprehensive database of predicted miRNA target sites in the human genome. Researchers can access this database to retrieve information on potential miRNA targets for specific miRNAs or genes.

Target Gene Lists: TargetScanHuman provides lists of predicted target genes for individual miRNAs or sets of miRNAs. These lists are valuable for researchers studying the regulatory networks involving miRNAs.

Updates: The database is regularly updated to include new miRNA data and improve the accuracy of target predictions.

Researchers often use TargetScanHuman to guide their experimental studies, validate miRNA-mRNA interactions, and gain insights into the roles of miRNAs in various biological processes and diseases.