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CRISPR-DT: Designing gRNAs for the CRISPR-Cpf1 System with Improved Target Efficiency and Specificity

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Abstract : The CRISPR-Cpf1 system has been successfully applied in genome editing. However, target efficiency of the CRISPR-Cpf1 system varies among different gRNA sequences. The published CRISPR-Cpf1 gRNA data was reanalyzed. Many sequences and structural features of gRNAs (e.g., the position-specific nucleotide composition, position-nonspecific nucleotide composition, GC content, minimum free energy, and melting temperature) correlated with target efficiency were found. Using machine learning technology, a support vector machine (SVM) model was created to predict target efficiency for any given gRNAs. The first web service application, CRISPR-DT (CRISPR DNA Targeting), has been developed to help users design optimal gRNAs for the CRISPR-Cpf1 system by considering both target efficiency and specificity. CRISPR-DT will empower researchers in genome editing.

Keywords : CRISPR-Cpf1, genome editing, target efficiency, target specificity
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