BepiPred-2.0: improving sequence-based B-cell epitope prediction using conformational epitopes

Antibodies have become an indispensable tool for many biotechnological and clinical applications. They bind their molecular target (antigen) by recognizing a portion of its structure (epitope) in a highly specific manner. The ability to predict epitopes from antigen sequences alone is a complex task. Despite substantial effort, limited advancement has been achieved over the last decade in the accuracy of epitope prediction methods, especially for those that rely on the sequence of the antigen only. Here, we present BepiPred-2.0 (http://www.cbs.dtu.dk/services/BepiPred/), a web server for predicting B-cell epitopes from antigen sequences. BepiPred-2.0 is based on a random forest algorithm trained on epitopes annotated from antibody-antigen protein structures. This new method was found to outperform other available tools for sequence-based epitope prediction both on epitope data derived from solved 3D structures, and on a large collection of linear epitopes downloaded from the IEDB database. The method displays results in a user-friendly and informative way, both for computer-savvy and non-expert users. We believe that BepiPred-2.0 will be a valuable tool for the bioinformatics and immunology community.

General information
State: Published
Organisations: Department of Bio and Health Informatics, Immunoinformatics and Machine Learning, La Jolla Institute for Allergy & Immunology
Contributors: Jespersen, M. C., Peters, B., Nielsen, M., Marcatili, P.
Number of pages: 6
Publication date: 2017
Peer-reviewed: Yes

Publication information
Journal: Nucleic Acids Research
Volume: 45
Issue number: W1
Article number: gkx346
ISSN (Print): 0305-1048
Ratings:
BFI (2019): BFI-level 2
Web of Science (2019): Indexed yes
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Scopus rating (2017): CiteScore 10.84 SJR 9.025 SNIP 3.028
Web of Science (2017): Impact factor 11.561
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 9.28 SJR 7.883 SNIP 2.744
Web of Science (2016): Impact factor 10.162
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): CiteScore 9.48 SJR 7.358 SNIP 2.631
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): CiteScore 8.74 SJR 6.64 SNIP 2.552
Web of Science (2014): Impact factor 9.112
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): CiteScore 8.46 SJR 6.801 SNIP 2.284
Web of Science (2013): Impact factor 8.808
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2