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SARS-CoV-2 Vaccine Development: Incorporating Al into epitope-based vaccine design

Wednesday 23 September 2020 10:50 (30 minutes)

After the initial outbreak in China, the spread of infectious disease caused by novel coronavirus has rapidly transformed to a global pandemic. The rapid speed of modern DNA sequencing technology has enabled the quick determination of COVID-19 genetic sequence, which has triggered multiple efforts worldwide for the development of a vaccine against the novel coronavirus.

During the talk, I will present the results from our recent work [1], including viral pathogenesis of SARS-CoV-2, the description of the defensive machinery existing within the human body, and how the immune system can be boosted by a T-cell epitope vaccine. Starting with the Machine Learning 101, I will outline the three consecutive biological events essential for the recognition of virus-infected cells by the immune system, and discuss how to model them using AI algorithms. The population coverage of a COVID-19 vaccine will also be discussed through the analysis of HLA sharedness among the selected epitopes.

AI aided design of epitope-based vaccine for the induction of cellular immune responses against SARS-CoV-2, G. Mazzocco, I. Niemiec, A. Myronov, P. Skoczylas, J. Kaczmarczyk, A. Sanecka-Duin, K. Gruba, P. Król, M. Drwal, M. Szczepanik, K. Pyrć, P. Stępniak, bioRxiv 2020.08.26.267997

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