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Artificial Intelligence in Vaccine and Drug Design

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Abstract

Knowledge in the fields of biochemistry, structural biology, immunological principles, microbiology, and genomics has all increased dramatically in recent years. There has also been tremendous growth in the fields of data science, informatics, and artificial intelligence needed to handle this immense data flow. At the intersection of wet lab and data science is the field of bioinformatics, which seeks to apply computational tools to better understanding of the biological sciences. Like so many other areas of biology, bioinformatics has transformed immunology research leading to the discipline of immunoinformatics. Within this field, many new databases and computational tools have been created that increasingly drive immunology research, in many cases drawing upon artificial intelligence and machine learning to predict complex immune system behaviors, for example, prediction of B cell and T cell epitopes. In this book chapter, we provide an overview of computational tools and artificial intelligence being used for protein modeling, drug screening, vaccine design, and highlight how these tools are being used to transform approaches to pandemic countermeasure development, by reference to the current COVID-19 pandemic.

Keywords: Artificial intelligence, AI; Artificial neural networks; Deep learning; Machine learning; Vaccine design.

LinkOut – more resources