

Scientists map the human proteome

October 19 2020



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Twenty years after the release of the human genome, the genetic "blueprint" of human life, an international research team, including the University of British Columbia's Chris Overall, has now mapped the first draft sequence of the human proteome.

Their work was published Oct. 16 in *Nature Communications* and announced today by the Human Proteome Organization (HUPO).

"Today marks a [significant milestone](#) in our overall understanding of

human life," says Overall, a professor in the faculty of dentistry and a member of the Centre for Blood Research at UBC. "Whereas the [human genome](#) provides a complete 'blueprint' of [human genes](#), the human proteome identifies the individual building blocks of life encoded by this blueprint: proteins. "Proteins interact to shape everything from life-threatening diseases to cellular structure in our bodies."

With 90 percent of the proteins in the human body now mapped, Overall says scientists have a deeper understanding of how individual proteins interact to influence human health, providing insights into [disease prevention](#) and individualized medicine.

Their work may have implications for scientists studying potential treatments for COVID-19.

"In COVID-19, for instance, there are two proteomes involved, that of the SARS-CoV-2 virus and that of the [infected cells](#), both of which likely interact with, modify, and change the function of the other," says Overall. "Understanding this relationship can shed light on why some cells and individuals are more resilient to COVID-19 and others more vulnerable, providing essential functional information about the human body that genomics alone cannot answer."

As many human diseases result from changes in the composition or functions of proteins, mapping the proteome strengthens the foundation for disease diagnosis, prediction of outcomes, treatment, and precision medicine.

"Humans share 99.9 percent of their DNA between individuals, yet deficiencies in the proteome 'parts' stemming from inherited [genetic mutations](#) can lead to genetic diseases, or defective or inadequate immune and cellular responses to environmental, nutritional and infection stressors," says Overall. "Knowing which proteins are key to

protection from disease, and the deficiencies in expression or activity that are hallmarks of disease, can inform individualized medicine and the development of new therapies."

More information: Subash Adhikari et al, A high-stringency blueprint of the human proteome, *Nature Communications* (2020). [DOI: 10.1038/s41467-020-19045-9](https://doi.org/10.1038/s41467-020-19045-9)

Provided by University of British Columbia

Citation: Scientists map the human proteome (2020, October 19) retrieved 6 May 2024 from <https://medicalxpress.com/news/2020-10-scientists-human-proteome.html>

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