

Human Proteoform Project: Introduction and framing

Neil Kelleher, PhD

Northwestern University

Abstract

The Consortium for Top-Down Proteomics (CTDP) is laying the groundwork for the Human Proteoform Project (HPfP). The goal of this ambitious initiative is to sequence the human proteome to accelerate the development of life-saving diagnostics that are more sensitive and accurate for detecting all types of human disease. It will enable faster and more effective treatments for a range of diseases, from cancer and heart disease to neurodegenerative disorders. It will spur innovation and job creation in the life sciences industry, including biotech, pharma, agriculture, forestry and veterinary science. The HPfP is a natural next step to the Human Genome Project (HGP) and will mirror its impact on healthcare and life sciences, return on investment and the economy. Proteins in their myriad forms, for example, proteoforms, are the fundamental working elements of our cells and tissues. Although a single cell contains hundreds of thousands of different proteoforms, existing analytical methods detect fewer than 10,000. The HPfP will remedy this knowledge gap through development of new and existing technology and high-throughput methods to create a comprehensive atlas of the proteoforms found in the cells, fluids and organs of the human body (for example, the Human Proteoform Atlas).