

## The Human Protein Index

Of the roughly 50,000 different proteins that the human body contains, scientists have identified only 1% to 2%. However, using powerful two-dimensional gel separation techniques, we have begun to establish a human protein index of proteins present in various human cells and fluids in health and disease. The index will allow systematic exploration of gene regulation and misregulation, as in cancer.

Separation in the first dimension depends on isoelectric focusing whereby proteins separate on the basis of their isoelectric points. In the second dimension, sodium dodecylsulfate electrophoresis separates proteins on the basis of their molecular weights.

Computer scanning is used to analyze and record the amounts and locations of specific proteins on the two-dimensional gel. Above, on the facing page, 2,013 proteins from human lymphocytes are visualized. Below, computer modeling of the amounts and locations of a group of proteins from human prostatic fluid is shown.

The incredible diversity of proteins in these gels suggested the appearance of the heavens, and we named the computer program that charts the proteins "Tycho" after the astronomer Tycho Brahe who cataloged the stars. The program that will compare and analyze protein populations will be named "Kepler."

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