

Experts Reveal the Working Ribosomes

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✦ - *Two new studies detail the actions of the ribosome inside cells*

The ribosomes are some of the most important structures inside the human cells, as they play a fundamental role in making proteins from amino acids. Without proteins, our bodies would have no clue what to do, and all of the cells would die off very fast. Two new scientific studies have recently shed new light on the intricate workings of this elusive structure, which saw three of its researchers win the Nobel Prize for Chemistry this year. The papers reveal how the ribosome interacts with two of its closest companions, and how it guides them to their respective destinations inside the cells.

Both of the researches used an observation method known as molecular dynamics flexible fitting (MDFF) to look at the ribosomes in their natural environments, without interfering with their motions or functions. What MDFF does is combine data from two atomic-level sources – X-ray crystallography and cryo-electron microscopy (cryo-EM) – into a single stream of data, which is detailed enough to answer most questions the researchers using them may have.

The crystallography process was used because it could image static molecules at high resolutions, while cryo-EM could image moving molecules, but at low resolutions. A combination of the two proved to be the perfect method for viewing the ribosomes. The study was conducted by experts at the University of Illinois at Urbana-Champaign.

According to experts, the new observation method is gradually picking up steam in the scientific community, as crystallographers and cryo-EM experts alike are starting to pick up on the amazing advantages. The X-ray machine is the perfect complement to the Em instrument, which is able to create a three-dimensional snapshot of the molecules of interest at any time. "It is like a cloud that gives you the volume within which you find 90 percent of all the electrons of the system," Physics Professor Klaus Schulten, the author of both research studies, says.

Schulten and his team are fascinated by the ribosome, which they consider to be perhaps the most complex molecular machine inside the human body. These papers, as well as a number of upcoming ones, highlight their dedication to unraveling the mysteries of the human body, a field of research that may result in a number of new treatments for a large range of medical conditions. Details of the two papers are published in the latest issue of the respected journal Proceedings of the National Academy of Sciences (PNAS).

