

The movement of proteins

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Cristian Micheletti, a scientist of the International School for Advanced Studies of Trieste (SISSA), has published in *Physics of Life Reviews* a review on an innovative instrument for protein analysis, a method for which Micheletti and his research team are a reference point for the international scientific community.

In order to understand how a protein works one may analyze its [chemical composition](#) or observe its shape. However, a brand new way to study proteins is to observe their flexibility and how their different parts move. Cristian Micheletti of SISSA, a pioneer scientist in this kind of research, has just published a systematic revision of all literature concerned with such new and promising field of research, which reveals the great potentialities of such an innovative methodology.

Proteins are molecules that within a [living organism](#) perform a vast array of roles that are fundamental for its survival. Scientists study them, for instance, observing their composition and unveiling their [chemical sequence](#) (the chain of [amino acids](#) a protein is composed of.) Another approach tries instead to define the three-dimensional [structure of proteins](#), which is fundamental to understand their functions. All these analyses are usually carried out through comparative methods comparing various [molecules](#). A new frontier today is represented by the studies exploring the "internal dynamics" of proteins, that is to say the way they fold and change shape.

"Let's envisage a pair of scissors, an object which performs a precise function. We may analyze the material they are made of, which will give

us indications on their use. We may then observe its shape, which will provide further information. We may finally observe how the different parts they are composed of move, so that we may at last gain a comprehensive overview of their function", explains Micheletti. "This is what we are doing with our group at SISSA: we observe how the units forming proteins move and we try to develop the comparative analysis instruments that may be useful to the entire scientific community."

Micheletti and his research group have been among the first to work in that respect and are an authoritative voice in the field, so much that the Physics of Life Reviews has chosen to ask the scientist himself this review.

"Our research will definitely not end here", clarifies Micheletti. "We are actually working to improve the analysis techniques. Such review, however, will be a thorough outline of the state of the art that will guide us and also all those who are working in this field today."

More information: www.sciencedirect.com/science/.../S1571064512001327

Comparing proteins by their internal dynamics: Exploring structure–function relationships beyond static structural alignments, Physics of Life Reviews, Available online 25 October 2012. ISSN 1571-0645

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