

One of the most highly esteemed biomedical awards given in Switzerland

Otto Naegeli Prize 2018

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The Otto Naegeli Prize for Medical Research attracts significant international attention. In this issue of the *Swiss Medical Forum*, the recipient of the 2018 award presents his research work in a concise review. The publication of this article in the *Swiss Medical Forum* provides a wide audience of medical professionals in Switzerland and abroad with first-hand information about an exemplary and outstanding research programme led by the 2018 prize winner Professor Nenad Ban.

The 2018 Otto Naegeli Prize was awarded to Professor Nenad Ban from the Department of Biology at ETH Zurich. The justifications of the scientific advisory committee are presented in the official laudatio by former prize awardee Professor Ruedi Aebersold:

Nenad Ban is recognised for his outstanding contributions to the field of biochemistry and structural biology, particularly the determination of the atomic structure of large macromolecular assemblies.

For centuries science and society have debated the question of whether living organisms are fundamentally different from nonliving matter. Some scientists thought that living organisms could eventually be explained by the principles of physics and chemistry, whereas others, the proponents of *vitalism*, invoked some nonphysical element as a fundamental property

of living systems. Research in the 20th century established definitively that the processes of life consist of a myriad of chemical reactions that are catalysed by biomolecules, and that the function of these biomolecules depends on the precise location of each of the molecule's atoms in relation to the other atoms of the molecule. These insights are the roots of the field of structural biology.

The catalytic biomolecules of the cell are molecular machines of enormous complexity, frequently consisting of proteins that associate with other proteins, nucleic acids or lipids. The molecular machines that catalyse the protein biosynthesis, including the ribosomes, are among the most complex structures known and essential for every living organism. Nenad Ban has dedicated his scientific career to analysis of their structure and function. After studying molecular biology in



Winner of the Otto Naegeli Prize 2018: ETH structural biologist Nenad Ban in his office on the Hönggerberg campus (picture: Katarzyna Nowak / ETH Zurich, reproduced with kind permission).

Zagreb, Croatia, he continued his education in the United States and earned his PhD at the University of California, Riverside. He then joined the group of Professor Thomas Steitz at Yale University to tackle perhaps the most challenging and most important structural biology challenge at the time, the structure of the ribosome. As a postdoctoral fellow, he was instrumental in solving the structure of the ribosome, a monumental achievement that was recognised in 2009 with the Nobel Prize to Professors Ramakrishnan, Steitz and Yonath.

Nenad Ban then joined the Department of Biology at ETH Zurich as an Assistant Professor and rose to the level of Full Professor. In his position at ETH he continued his spectacular success in solving the atomic structure of complex molecular machines, including that of fatty acid synthase, the structure of ribosomal complexes with various factors that modulate and control protein synthesis, and the structure of RNA riboswitches. Nenad Ban's group is also internationally recognised for methodological advances in structural biology. This is exemplified by his leadership role in the implementation of the revolutionary cryo EM

single particle technology at ETH. In pioneering work he applied this new technology to the determination of the mitochondrial ribosome, a challenge that had eluded structural biologists for decades.

His scientific articles in the field of structural biology have been recognised by multiple international scientific awards and memberships of learned societies, and established Nenad Ban as one of the leading structural biologists of his generation. It can be expected that he will remain at the forefront of his field for a long time to come.

Disclosure statement

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The Otto Naegeli Prize was established in 1960, in memory of Professor Otto Naegeli, the distinguished scientist and teacher of internal medicine at the University of Zurich, who died in 1938 (<http://www.otto-naegeli-preis.ch/home-2.html>).

The Otto Naegeli Prize aims to stimulate and recognise outstanding medical and biomedical research, and is awarded every other year to researchers in Switzerland. Currently the prize money amounts to CHF 200 000.

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