

Press Release of the Lindau Nobel Laureate Meetings

An Illuminating Interdisciplinarity

The Lindau Nobel Laureate Meetings mirror the History of uncovering the Secrets of Life

Lindau, June 15th, 2010. Ada E. Yonath, the fourth woman who was ever awarded a Nobel Prize in Chemistry (2009), will open the Scientific Programme of the 60th Meeting of Nobel Laureates in Lindau on June 28th. In a lecture titled *"The amazing ribosome,"* she will talk about this specific biological factory of medical importance whose chemical construction she elucidated with a physical method. Thus her subject perfectly fits the interdisciplinarity of this year's anniversary when 61 Laureates in physics, chemistry and physiology or medicine will convene at Lake Constance, almost three times as many Laureates than usual. The audience will include 650 top talented young researchers, 275 of whom are women, from 70 countries.

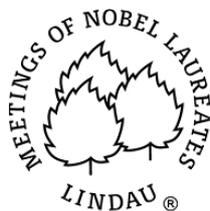
Yonath's talk also exemplifies the breathtaking pace at which biochemistry has developed since the inaugural Lindau Nobel Laureate Meeting in 1951 when neither the structure nor the functionality of the genetic information carrier DNA was known and all proteins were still largely obscure. In his inspiring lecture at Lindau in 1968, titled the *"History of the Determination of Protein Structure"*, the physicist Sir Lawrence Bragg underlined the vital importance of an interdisciplinary cooperation between the sciences to uncover the secrets of life. Based on a discovery of the German physicist Max von Laue, Bragg had invented x-ray crystallography together with his father Henry shortly before World War I, an achievement that earned them the Nobel Prize in Physics in 1915. Lawrence Bragg was 25 years old then – as young as many of the international top talents taking part in this year's meeting.

Crystal Keys are elucidating Life

After having been appointed head of the Cavendish Laboratory in Cambridge, England, in 1938, Bragg oversaw the application of x-ray crystallography to the structural elucidation of complex molecules of life with enduring and encouraging leadership. It was at the Cavendish where Francis Crick and James Watson (Nobel Prize in Medicine 1962) – drawing on data from Rosalind Franklin – deciphered the structure of DNA. Working also at the Cavendish, John Kendrew and Max Perutz (Nobel Laureates in Chemistry 1962)

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elucidated the first structures of big proteins. Bragg proudly mentioned these successes in his lecture which is available on the newly created media online library of the Lindau meetings. "A few years ago, two of the young people working in my physics laboratory shared the Nobel Prize for Chemistry, and two of them shared the Nobel Prize for Medicine", he cheerfully turned to Count Bernadotte in his introductory remarks. "There is therefore no reason that I can see that you should not invite me every year."

Persistence and the interaction of sciences in the development of new methods led to our current knowledge of many highly complex three-dimensional structures in nature. Max Perutz, for example, spent more than 20 years elucidating the structure of the oxygen transporter haemoglobin, a protein with approximately 10.000 atoms. Quite similarly Ada E. Yonath showed great ambition when she decided to embark on the adventure of mapping the structure of the ribosome, a complex of many proteins and nucleic acids specializing in protein synthesis and consisting of hundreds of thousands of atoms, at the end of the 1970s. The scientific community was quite sceptical about her chances of success. Nevertheless, Yonath pursued her project, and Thomas Steitz and Venki Ramakrishnan, working in their own labs, later decided to join her efforts. In 2000, all three scientists published their results which turned out to be worth a Nobel Prize.

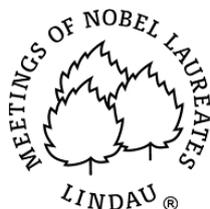
Structural Biology remains challenging

Many insights into basic functions of life are owed to x-ray crystallography. How the genetic information stored on DNA is copied to RNA and serves as a blueprint for protein synthesis at the ribosome, is something we have learned to understand in detail from crystallographers, in addition to many mechanisms of transport and communication via proteins in cell membranes. One of the innumerable proteins of life is the smallest natural engine, ATP synthase, an enzyme that produces the energy required for living in the power stations of our cells, the mitochondria. John E. Walker (Nobel Prize in Chemistry 1997), who revealed its function by means of crystallography, will come to Lindau this year. Also attending the meeting this year are Hans Deisenhofer, Robert Huber and Hartmut Michel who first succeeded in elucidating the structure of a membrane protein, an achievement that earned them a Nobel Prize in Chemistry in 1988.

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But knowing the spatial structure of a biomolecule not necessarily enables a scientist to directly deduce its function. Many correlations between structure and function remain to be resolved, as Deisenhofer will discuss in his talk „*Structural Studies on Cholesterol Transport*“. Nuclear magnetic resonance (NMR) spectroscopy might help for a better understanding and is gaining increasing importance for the structural elucidation of biomolecules. One of its pioneers, Kurt Wüthrich (Nobel Prize in Chemistry 2002), will talk about „*Structural Genomics with the Expanding Universe of Protein Sequences*“. A panel with five Laureates will discuss the „*Impact of Chemistry and Physics to Biomedicine*“ on Tuesday, June 29. The current topic of artificial life will play a role already on Monday, immediately after Yonath's opening lecture. Jack W. Szostak, last year's Nobel laureate in medicine, will take centre stage with his lecture „*Learning about the Origin of Life from Efforts to Design an Artificial Cell*“.

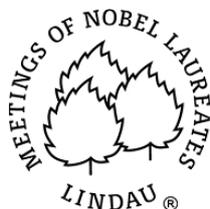
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Supplementary Material

The Lindau Media Online Library contains valuable audio and video recordings beginning with lectures from 1952.

Quotes from Sir Lawrence Bragg (Nobel Prize in Physics 1915) at Lindau 1968:

<http://www.lindau-nobel.org/MediaContainer.AxCMS?type=lectures&meeting=234&elementID=293>

00:50: "...a few years ago, of the young people working in my physics laboratory, two of them shared the Nobel Prize for Chemistry, and two of them shared the Nobel Prize for Medicine. There is therefore, Count Bernadotte, no reason that I can see that you should not invite me every year..."

7:07: "...the chance of our getting out this problem is practically zero; on the other hand, the importance of getting it out if we are successful is practically infinity. And if you multiply zero and infinity it is possible that you will get something..."

All co-workers of Lawrence Bragg who won a Nobel Prize in 1962 participated at least once in a meeting in Lindau. James Watson's Lindau lecture „*RNA Viruses and Protein Synthesis*“ – delivered in 1967 – is already accessible in the media online library. Francis Crick participated in 1981 without delivering a lecture. The lectures of John Kendrew from 1964, of James Watson from 1981; and of Max Perutz from 1986 and 1999 are digitally filed but not yet available online.

Two lectures of x-ray-crystallography pioneer Dorothy Crowfoot Hodgkin from 1970 and 1983 which are available in the Lindau media online library are noteworthy, too. She was the only female scientist besides Marie Curie who ever received an unshared Nobel Prize in Chemistry (in 1964, in recognition of her pioneering x-ray analyses of penicillin and vitamin B12).

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