

**Robert Huber**

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Photosynthesis, its importance, and structure determination:

“Photosynthesis is the most important chemical reaction on earth”. This is the beginning of the official Nobel press release for the 1988 chemistry award, which was shared by three scientists for their determination of the three-dimensional structure of a photosynthetic reaction centre.

Robert Huber, Hartmut Michel from the Max-Planck-Institute of Biochemistry in Martinsried (MPIB) and the Max-Planck-Institute of Biophysics in Frankfurt am Main and their fellow German, Johann Deisenhofer, based in the US, received the award for unravelling the full details of how a membrane-bound protein is built up.

Most schoolchildren know that plants use the energy of light to build organic substances by a process called photosynthesis but don't always appreciate that this is, in effect, how the most basic foodstuff in the world's food chain is created. The energy for life processes is then produced largely in the combustion of the organic substances by the oxygen in the air in cellular respiration. Simply put, oxygen in the air allows bodies to burn calories and this oxygen is produced by plants through photosynthesis. A simpler form of photosynthesis, which leads to the formation of organic material without liberation of oxygen, is found in certain bacteria.

The conversion of energy in photosynthesis and cellular respiration takes place through transport of electrons via a series of proteins, which are bound in special membranes. These proteins are difficult to obtain in a crystalline form but in 1982 Michel succeeded with a bacterial photosynthetic reaction centre, allowing him, along with Deisenhofer and Huber, to study its three-dimensional structure at atomic resolution. It was published in 1985 displaying the most complex protein cofactor crystal structure analysed at that time.

Robert Huber biography:

Robert Huber was born in Munich in 1937 and had a younger sister. He entered the Humanistische Karls-Gymnasium in 1947 with a sketchy education due to the war, but was fascinated by chemistry and read all the textbooks he could get. In 1956 he moved to the Technische Hochschule (now Technische Universität München, TUM) in Munich and earned a Chemistry degree in 1960. He went on to study crystallography under W. Hoppe, achieving his PhD in 1963 and deciphering together with P. Karlson, (LMU, Munich), the molecular structure of ecdysone, the insect moulting hormone, and its relationship to mammalian steroid hormones. In 1972 he was offered a professorship at the University

of Basel, Switzerland and the position of director at the newly founded MPIB in Martinsried which he accepted, but he remained associated with the TUM as professor.

At the MPIB, Huber's team studied proteins, often in collaboration with academia and industry elsewhere with a focus on proteins of medical interest and targets for drug development, especially proteolytic enzymes, and use in plant protection. They discovered the role of flexibility for protein structure and function. They also developed methods that are used in many laboratories to quantify the protein's structure through crystallography. He co-founded two Biotech companies located in Martinsried, PROTEROS offering services in structural biology and SUPPREMOL developing a new therapeutic protein modulating the immune response in autoimmune diseases. He serves as a scientific advisor in other companies, holds honorary professorships and doctorates of international universities, and was editor of the Journal of Molecular Biology for many years.

After his retirement in 2005, he has taken up posts at Cardiff University, UK and at the Universität Duisburg-Essen. He is emeritus group leader "Structure Research" at the MPIB and Emeritus of Excellence at the TUM in Munich.

Huber has four children with his former wife Christa. He is married to Brigitte Doleschel.