

## Stamp Vignette on Medical Science



### Johann Deisenhofer— Nobel Laureate in Chemistry

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German chemist Johann Deisenhofer shared the 1988 Nobel Prize in chemistry with Robert Huber (1937- ) and Hartmut Michel (1948- ) for determining the structure of certain proteins that are essential to photosynthesis. Michel crystallized the membrane-bound protein from the photosynthetic reaction center of the *Rhodospseudomonas viridis* bacterium, and from 1982 to 1985, the 3 scientists used x-ray crystallography to determine the exact arrangement of the more than 10,000 atoms that make up the reaction center found in certain photosynthetic bacteria. The photosynthetic center has a crucial role in initiating a simple type of photosynthesis. In addition to advancing the understanding of the mechanism of photosynthesis, the work of these investigators had other applications because membrane-bound proteins are important in many diseases. The protein is called a membrane-bound protein because it extends from the outside of the bacterial cell through the cell membrane to the interior of the cell. The specialized structure of the protein allows it to absorb light energy from the cell's surroundings and to use that energy to transfer electrons and hydrogen ions through the cell membrane to the inside of the cell. The work of the 3 laureates also revealed similarities between the photosynthetic processes of plants and bacteria.

Deisenhofer was born on September 30, 1943, on a family farm near the small village of Zusamaltheim, Ba-

vara, Germany (about 60 miles from Munich). Beginning in 1949, he attended elementary school in Zusamaltheim. He graduated from the Gymnasium in Augsburg in 1963 and passed the "Abitur" examination, which allowed him access to a university.

After serving 1½ years in the German army, Deisenhofer began studying physics and astronomy at the Technical University of Munich in the fall of 1965. In 1971, he was awarded a diploma in physics from the Technical University.

In June 1971, Deisenhofer joined a group of scientists under the supervision of Robert Huber in a laboratory at the Max Planck Institute. In 1972, the institute moved to Martinsried, a few miles from Munich, and became the Max Planck Institute for Biochemistry. There, Deisenhofer did research on the crystallographic refinement of the structure of bovine pancreatic trypsin inhibitor and received the PhD degree in 1974.

Deisenhofer was a postdoctoral fellow in Huber's laboratory for the next 2 years (1974-1976) and worked on various projects, including human myeloma protein and human Fc fragment and its complex with the Fc-binding fragment from protein A of *Staphylococcus aureus*. In 1982, Hartmut Michel joined Huber and Deisenhofer at the institute, and the researchers began the work that led to their Nobel Prize. Deisenhofer remained at the institute until 1987. In 1988, he moved to the United States to become a professor of biochemistry at the Texas Southwestern Medical Center at Dallas and a scientific investigator at the Howard Hughes Medical Institute.

In addition to the Nobel Prize, Deisenhofer has received many honors and awards, including the 1986 Biological Physics Prize from the American Physical Society and the 1988 Otto Bayer Prize, and membership in the Academia Europaea and the American Association for the Advancement of Science. He was honored on stamps issued by Grenada, Sierra Leone, and Togo in 1995.