

## Interfacial protons vs. bulk protons: How proton localization alters ATP synthase activity

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The universal biological principle of producing chemical energy in bacteria, plants and animals is based on a single protein, termed ATP-synthase. The ATP-synthase is one of the most important proteins responsible for synthesizing adenosine triphosphate (ATP, the currency of chemical energy) from adenosine diphosphate and phosphate in prokaryotes as well as in specialized organelles of eukaryotes. This protein is a molecular motor and its fuel are protons, which are in principle the smallest possible ions. Much is known about the way these protons pass through the protein and how this pathway is coupled to the production of chemical energy. However, the fundamental question of how the protons reach the protein is still poorly understood. In this project the scientists want to develop new experimental approaches to find answers to this question. The first one is based on a new type of a molecular probe, which enables to control the release of protons at different distances around the ATP synthase, either at the surface of the membrane or in solution. The second experimental approach enables to release protons next to the ATP synthase upon the application of a potential difference in a bioelectronic device. The results of this project will contribute fundamentally to the current understanding of this important biological process of energy conversion and will pave the way for the development of innovative devices for energy conversion.

## Projektbeteiligte

**Prof. Dr. Claudia Steinem** Universität Göttingen Faculty of Chemistry Insitute of Organic and Biomolecular Chemistry Göttingen

## Dr. Nadav Amdursky

Technion-Israel Institute of Technology Schulich Faculty of Chemistry Haifa Israel



Es werden die Institutionen genannt, an denen das Vorhaben durchgeführt wurde, und nicht die aktuelle Adresse.