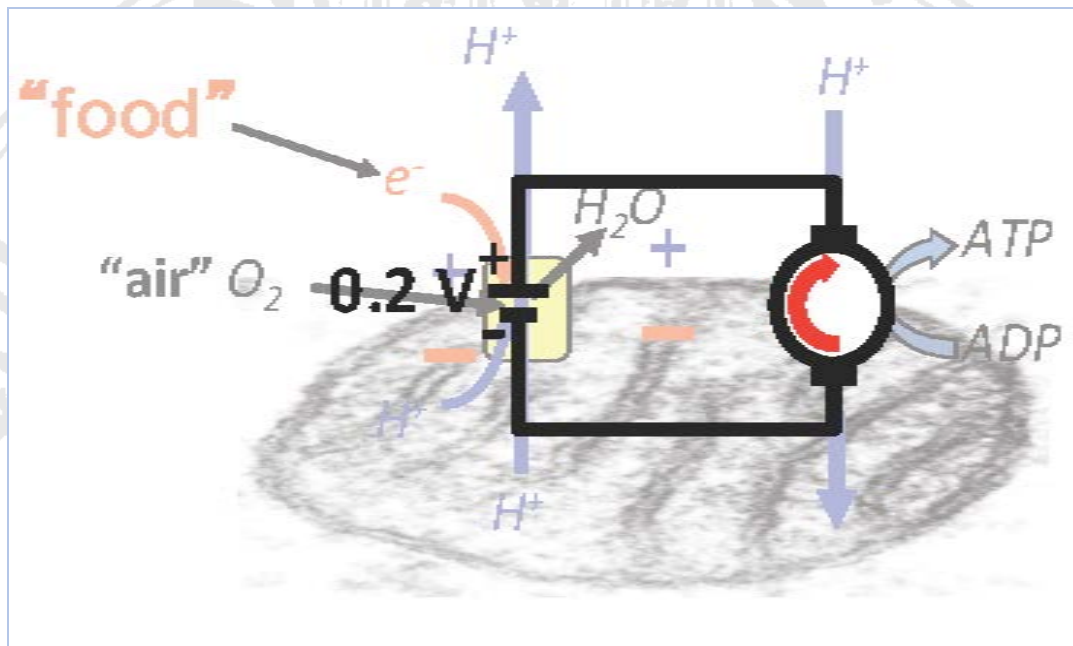


PHYSIKALISCHES KOLLOQUIUM

AM 24. NOVEMBER 2014 UM 17 UHR C.T.

IM GROßEN HÖRSAAL



MOLECULAR PUMPS AND MOTORS IN BIOLOGY

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Biomolecular machines carry out a wide range of functions, from chemical sensing and signaling over highly selective molecular transport to the efficient interconversion of chemical, mechanical, electrical, and light energy. We have used molecular dynamics simulations and statistical mechanical theory to characterize the molecular mechanisms underlying some of these biological processes. Remarkably, common physical principles emerge in the function of proteins serving as proton pumps, transporters, and molecular motors, despite large variations in their structure and biological role. In particular, water and hydration effects coupled to protein motions occupy central roles in the operation of these molecular machines, and are key to achieving both high efficiency and high fidelity.