Mark Prausnitz

Professor, Director of Center for Drug Design, Development, and Delivery, Chemical & Biomolecular Engineering at Georgia Tech College of Engineering
Atlanta, GA, US

Mark Prausnitz and his colleagues carry out research on biophysical methods of drug delivery.

Biography

Dr. Prausnitz and his colleagues carry out research on biophysical methods of drug delivery, which employ microneedles, ultrasound, lasers, electric fields, heat, convective forces and other physical means to control the transport of drugs, proteins, genes and vaccines into and within the body. A major area of focus involves the use of microneedle patches to administer vaccines to the skin in a painless, minimally invasive manner that improves vaccine effectiveness by targeting delivery to the skin?s immune cells. In collaboration with Emory University, the Centers for Disease Control and Prevention and other organizations, Dr. Prausnitz?s group is advancing microneedles from device design and fabrication through pharmaceutical formulation and preclinical animal studies through studies in human subjects. In addition to developing a self-administered influenza vaccine using microneedles, Dr. Prausnitz is translating microneedles technology especially to make vaccination in developing countries more effective. The Prausnitz group has also developed hollow microneedles for injection into the skin and into the eye in collaboration with Emory University. In the skin, research focuses on insulin administration to human diabetic patients to increase onset of action by targeting insulin delivery to the skin. In the eye, hollow microneedles enable precise targeting of injection to the suprachoroidal space and other intraocular tissues for minimally invasive delivery to treat macular degeneration, glaucoma and other ocular diseases. Dr. Prausnitz and colleagues also study novel mechanisms to deliver proteins, DNA and other molecules into cells. Bubble activity generated by laser-excitation of carbon nanoparticles breaks open small sections of the cell membrane and thereby enables entry of molecules, which is useful for targeted and intracellular drug delivery. In addition to research activities, Dr. Prausnitz teaches an introductory course on engineering calculations, as well as two advanced courses on pharmaceuticals, both of which he developed. He also serves the broader scientific and business communities as a frequent consultant, company founder and expert witness. Dr. Prausnitz is a Regents? Professor, the J. Erskine Love Jr. Professor in Chemical & Biomolecular Engineering, and director of the Center for Drug Design, Development and Delivery.

Areas of Expertise

Biotechnology, Materials and Nanotechnology, Biophysical Methods of Drug Delivery, Complex Systems

Education

Massachusetts Institute of Technology
Ph.D. Chemical Engineering

Stanford University
Chemical Engineering B.S.

Selected Accomplishments

MIT Technology Review Innovators Under 35
1999
