2022 Elsevier Distinguished Lecture

Biomaterials and Biotechnology: From the Discovery of the First Angiogenesis Inhibitors to the Development of Controlled Drug Delivery Systems and the Foundation of Tissue Engineering

Robert Langer

Institute Professor, Massachusetts Institute of Technology

April 18, 3 p.m. CDT

Delivered via Zoom

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Biography: Robert Langer is one of 12 Institute Professors at the Massachusetts Institute of Technology (MIT). He has written more than 1,500 articles, which have been cited more than 363,000 times. His h-index of 299 is the highest of any engineer in history and the fourth highest of any individual in any field. His patents have licensed or sublicensed to more than 400 companies. He is a cofounder of several companies, including Moderna. Langer served as chairman of the FDA's Science Board from 1999-2002.

Langer has received more than 220 awards. He is one of only three living individuals to have received both the US National Medal of Science and the US National Medal of Technology and Innovation. His other honors include the Charles Stark Draper Prize, Queen Elizabeth Prize for Engineering, Albany Medical Center Prize, Breakthrough Prize in Life Sciences, Kyoto Prize, Wolf Prize for Chemistry, Millennium Technology Prize, Priestley Medal, Gairdner Prize, Hoover Medal, and the Dreyfus Prize in Chemical Sciences. He holds 36 honorary doctorates and has been elected to the National Academy of Medicine, National Academy of Engineering, National Academy of Sciences, and National Academy of Inventors.

Abstract: Advanced drug delivery systems are having an enormous impact on human health. Langer will discuss his early research on developing the first controlled release systems for macromolecules and the isolation of angiogenesis inhibitors and how these led to numerous new therapies. This early research then led to new drug delivery technologies including nanoparticles and nanotechnology that are now being used to treat cancer, other illnesses, and in vaccine delivery (including COVID vaccines.) He will also discuss new oral delivery systems for macromolecules such as insulin that can deliver macromolecules by a unique mechanical design as well as ultra-long (weeks) acting oral delivery systems that have unique physical and mechanical structures. In addition, by combining mammalian cells, including stem cells, with synthetic polymers, new approaches for engineering tissues are being developed that may someday help in various diseases. Examples in the areas of cartilage, skin, blood vessels, and heart tissue repair will be discussed.

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