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HST.939 Designing and Sustaining Technology Innovation for Global Health Practice
Spring 2008

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Robert Langer

Robert S. Langer is one of 13 Institute Professors (the highest honor awarded to a faculty member) at the Massachusetts Institute of Technology (MIT).

Dr. Langer has written over 950 articles. He also has more than 600 issued or pending patents worldwide, one of which was cited as the outstanding patent in Massachusetts in 1988 and one of 20 outstanding patents in the United States.

Dr. Langer's patents have been licensed or sublicensed to over 200 pharmaceutical, chemical, biotechnology and medical device companies; a number of these companies were launched on the basis of these patent licenses. He served as a member of the United States Food and Drug Administration's SCIENCE Board, the FDA's highest advisory board, from 1995 -- 2002 and as Chairman from 1999-2002.

His work is at the interface of biotechnology and materials science. A major focus is the study and development of polymers to deliver drugs, particularly genetically engineered proteins, DNA and RNAi, continuously at controlled rates for prolonged periods of time. Work is in progress in the following areas:

- Investigating the mechanism of release from polymeric delivery systems with concomitant microstructural analysis and mathematical modeling.
- Studying applications of these systems including the development of effective long-term delivery systems for insulin, anti-cancer drugs, growth factors, gene therapy agents and vaccines.
- Developing controlled release systems that can be magnetically, ultrasonically, or enzymatically triggered to increase release rates.
- Synthesizing new biodegradable polymeric delivery systems which will ultimately be absorbed by the body.
- Creating new approaches for delivering drugs such as proteins and genes across complex barriers in the body such as the blood-brain barrier, the intestine, the lung and the skin.
- Researching new ways to create tissue and organs including creating new polymer systems for tissue engineering.
- Stem cell research including controlling growth and differentiation.
- Creating new biomaterials with shape memory or surface switching properties.
- Angiogenesis inhibition

Dr. Langer has received over 150 major awards. In 2007, he received the 2006 United States National Medal of Science. In 2002, he received the Charles Stark Draper Prize, considered the equivalent of the Nobel Prize for engineers and the world's most prestigious engineering prize, from the National Academy of Engineering. He is also the only engineer to receive the Gairdner Foundation International Award; 68 recipients of this award have subsequently received a Nobel Prize.