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FAN YUAN, PROFESSOR

Dr. Yuan's research interests include drug and gene delivery, mechanisms of molecular transport in cells and tissues, and tumor pathophysiology.


Cure of cancer through chemotherapy requires drug molecules to reach all tumor cells at an adequately high concentration. At present, such a requirement cannot be satisfied in most patients. This is because (a) amount of drugs that can be administered into patients is limited by normal tissue tolerance and (b) drug distribution and cellular response to drugs in tumors are heterogeneous. Therefore, cells in regions with drug concentration below the therapeutic level will cause tumor recurrence and they may also develop resistance to future treatment.

The goal of our research is two-fold. One is to improve delivery of therapeutic agents in solid tumors; and the second is to understand mechanisms of drug resistance in tumors caused by intrinsic cellular heterogeneity and physiological barriers. These studies may provide useful information on how to improve clinical treatment of cancer based on currently available drugs or molecular medicines in the future.

Research projects in our lab include quantification of transport parameters, delivery of drugs encapsulated in temperature sensitive liposomes, physical interventions of drugs, electric field-mediated gene delivery, mathematical modeling of drug and gene delivery.



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Teaching (Spring 2010):

- BME 247.01, *DRUG DELIVERY* Synopsis

Education:

PhD, The City University of New York, 1990
 MS, Peking University, 1985
 BS, Peking University, 1983

Specialties:

Drug Delivery
 Biological Transport
 Cancer diagnostics and therapy

Research Interests:

Dr. Yuan's research interests include drug and gene delivery, mechanisms of molecular transport in cells and tissues, and tumor pathophysiology.

Awards, Honors, and Distinctions

Fellow, American Institute for Medical and Biological Engineering, 2006
 NSF Early CAREER Award, National Science Foundation, 2000

Wang, Y. and Yuan, F., *Delivery of viral vectors to tumor cells: extracellular transport, systemic distribution, and strategies for improvement*, Ann. Biomed. Eng. (USA), vol. 34 no. 1 (2006), pp. 114 - 27 [s10439-005-9007-2] [abs].

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