

BME 695L Engineering Nanomedical Systems

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"Need for New Perspectives on Medicine"

- I. The Progression of Medicine
 - A. Conventional "modern" medicine
 - B. "Personalized" or "molecular" medicine
 - C. Nanomedicine "single-cell" medicine

- II. How Conventional Medicine Works for Diagnosis of Disease
 - A. Identification of the "diseased state"
 - B. Simple measurements of body structure and function
 - C. Follow-up clinical tests
 - D. Internal examinations by non-invasive in-vivo imaging
 - E. Molecular tests for specific gene properties
 - F. Comparison of individual results with "normal ranges"

- III. How Conventional Medicine Works for Treatment of Disease
 - A. Stabilization of patient – "heal thyself"
 - B. Surgical repair of injuries
 - C. Treatment with drugs locally
 - D. Treatment with drugs systemically
 - E. Treatment with targeted therapies

- IV. Factors Limiting the Progress of Medicine
 - A. Economics
 - B. Politics

- V. Some Specific Problems with Conventional Medicine
 - A. Consequences of waiting for patient symptoms
 - B. Trained people and modern drugs are expensive
 - C. Diagnostic technologies, if available, are still relatively primitive and/or expensive
 - D. Crude targeting of drugs

- Vi. Personalized Medicine
 - A. Based on genetic characteristics of the individual patient
 - B. Specific gene rearrangements or mutations
 - C. Specific SNPs (Single Nucleotide Polymorphisms)

- VII. Nanomedicine
 - A. Medicine performed at single cell level
 - B. Possibility of "regenerative medicine"
 - C. Blurring of distinction between prevention and treatment

Lecture 1: References

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