EID: Emerging Infectious Disease

Three kinds of EID

- Emerging Infectious Diseases
  - SARS, HPAI, “the unknown” etc.
- Existing Infectious Diseases
  - Measles, Dengue, AIDS etc.
- Eradicated Infectious Disease(s)
  - Smallpox

Lessons from Eradicated ID

- Vaccine can be a powerful tool.
  (overemphasized?)
- Possibility of bioterrorism
- Lack of therapeutic drugs
- Difficulty in research efforts

Lessons from Existing ID

- Vaccination programs aren't always easy.
  (ex. Measles)
- Vaccine development isn't always easy.
  (ex. Dengue and HIV)
  - Technical difficulties
  - Ethical issues
- Anti-viral drugs can be effective.
  (ex. HIV and influenza)

Currently Available Interventions

	Vaccine	Drug
Smallpox	O	X
Measles	O	X
HIV	X	O
Dengue	X	X
Influenza	O	O
SARS	X	X
HPAI	X	O?
The Unknown	X	X

Current Problems

- Overexpectation for vaccine development

  ("Myth" from smallpox eradication?)

- Insufficient efforts toward drug development
  - Effects of the "myth"?
  - Technical difficulties?
  - Delays in approval?
  - Insignificant incentives?

For early intervention, drug development is indispensable.

Required Technological Development

- Rapid system for drug development
  - High-throughput assay system for pathogen proteins
    - Cell-based
    - Cell-free
  - Structure-based drug designing
    - Protein 3D structure determination
    - Molecular modeling
    - Chemical engineering
- Elucidation of pathogen-specific immune responses
  - Innate immunity vs. acquired immunity
  - Cellular immunity vs. humoral immunity
  - Vaccine vs. drug

Balanced Strategic Efforts

- Drug development or vaccine development?
  (Different priorities for different diseases)
- Proper allocation of resources
  (human resources, materials, funds etc.)
- Academic incentives for anti-viral drug research
- Commercial incentives for drug development