

## **41. Protein Engineering**

1 unit, Xinbo Yang, November 21, 2025

In this lecture, I plan to cover various topics in protein engineering application in therapeutic development with the emphasize on immunotherapy. The course outline is listed as below:

1. What is protein engineering (cover several state-of-the-art of protein engineering techniques. (0.5 hour)
2. Covering a brief immunology overview with the emphasize on T cell biology. (1 hour)
  - a. Principles of antigen receptors (signal 1)
  - b. Principles of co-stimulatory and co-inhibitory signals (signal 2)
  - c. Principles of cytokine functions (signal 3)
3. How protein engineering could apply to modulate immune functions. (1.5 hour)
  - a. Cytokine engineering (engineering signal 3)
  - b. Immune checkpoint engineering (engineering signal 2)
  - c. Antigen receptor engineering (engineering signal 1)