Bioinformatics and biophysics approaches in cultured meat research

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Zoom

Hosted by Dr Andy Tan

Seminar Abstract

In this talk, I will discuss three projects related to cultured meat. First, we will argue that the optimization of cell culture media requires a "systems biology" approach. By combining next-generation sequencing and proteomic and metabolomic profiling, we can systematically study how changing the composition and concentration of different components of the culture medium affects cell growth and proliferation. The eventual goal is to develop a computational model to predict media optimization, so as to reduce the time and money spent in finding the optimal formulation.

Second, many cultured meat products currently take the form of minced patties or nuggets instead of cut steaks. The ability to culture meat products with steak-like texture will be of vast commercial interest. We will discuss how scaffolds with surface micro/nano-topographies, borrowed from techniques in tissue engineering and regenerative medicine, can promote the alignment and striation of skeletal muscle cells to realize the texture of real meat.

Third, we will discuss the biophysics of chewing. During chewing, food and saliva combine to form a ball. The mouth, tongue and throat muscles then contract to transport this ball from the front to the back of the mouth and down the throat. We propose to develop a computational model of this process, so that the textural properties of cultured meat products can be optimized in the sense that the sensory perception of its chewing is identical to that of a piece of real meat.

About the Speaker

Chiam Keng Hwee is a Senior Principal Investigator at the Bioinformatics Institute. He works at the interface of physics and biology, collaborating very closely with experimental groups in developing theories and models for a variety of problems in mechanobiology and biological physics, systems biology, and biological fluid mechanics.