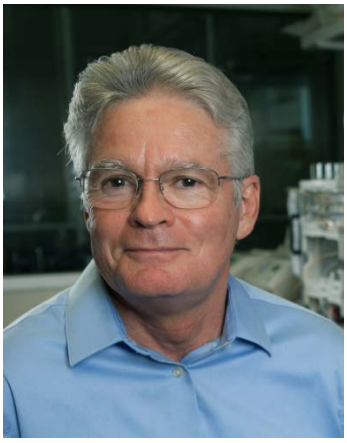
UCLA ENGINEERING
Chemical and Biomolecular Engineering

SEMINARS IN CHEMICAL AND BIOMOLECULAR ENGINEERING



Friday, April 27th, 2018 | 10:00AM **Boelter Hall 3400**

Presented by:

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"Opening Microbial Cells Expands Their Potential"

This talk will explain how multiple advances in the technology for cell-free protein synthesis (CFPS) may be on the verge of expanding the biopharmaceutical industry.

The era of rRNA biopharmaceuticals was launched using E.coli in the early 1980's to produce proteins such as human insulin (Eli Lilly), human growth hormone (Genentech), granulocyte colony stimulating factor (Amgen), and alpha-interferon (Genentech and Roche). However, as the complexity of the protein pharmaceuticals increased, the industry turned to eukaryotic cells to provide more complex disulfide bond patterns and glycosylation for products such as erythropoietin (Amgen) and tissue-plasminogen activator (Genentech). Further driven by the emergence of monoclonal antibodies as a large family of potent and versatile pharmaceuticals, CHO cells then emerged as the dominant production platform.

Ironically, the need for even more complexity and precision may now be motivating a shift back to prokaryotic systems. Sutro Biopharma, independently and in collaboration with Celgene and Merck Serono, is now developing a new class of antibody drug conjugates (ADCs) produced using E.coli cell extracts. They have established GMP manufacturing capability and are nearly ready for human trials. CFPS is providing direct access to the protein synthesis reaction chamber, and that allows the spatially precise introduction of uniquely reactive, non-natural amino acids. This, in turn, enables the precise localization of an exact number of drug molecules per antibody. It also speeds up the production and screening of many ADC candidates so that safety and efficacy can be more effectively optimized. While the jury is still out, such products may be the wave of the future.

This presentation will summarize the technology foundation being used by Sutro. It will then go on to describe how the capabilities of this platform are being further expanded so even more complex pharmaceutical targets can be approached. As an example, the development of highly potent, modular vaccines and novel drug delivery vehicles will be described. Both are based on a multiply-modified Virus-like Particle (VLP) derived from the core protein capsid of the hepatitis B virus. Both pursuits rely upon the versatility offered by CFPS.