

DAVID E. BLOCK

"Creating Real Steak Without the Cow:
Using Insights from Wine and
Biopharmaceutical Production to
Commercialize Cultivated Meat"

Wednesday

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3:30 PM

Wu and Chen Auditorium

Levine Hall



Ernest Gallo Endowed Chair
Viticulture and Enology, Chemical Engineering
University of California, Davis

ABSTRACT

Between a growing global population and increased consumption of meat from developing countries, it is projected that meat production will have to increase by at least 60% by 2050 to meet demand. It is unlikely that expanded conventional animal agriculture alone will be able to meet this need. Therefore, alternatives to conventional meat will be required at a very large scale. This is likely to include plant- and fungal-based meat alternatives, as well as cultivated meat—the growth of animal stem cells in large-scale fermentors with subsequent differentiation into muscle, fat, and connective tissue cells. While close to 150 companies have formed in the last eight years internationally to commercialize this technology, only three products are currently on the market, a chicken nugget sold at two restaurants in Singapore, and two chicken products recently approved for sale in the US, but not yet widely available. Aside from federal regulatory hurdles, difficult technical hurdles remain. These include development of cell lines well-suited for production, inexpensive growth and differentiation media, creation of structure into whole cuts like marbled steaks, and scale-up to a commercial size potentially 10 times larger than anything previously attempted for cell-culture-based processes. After presenting the field and our consortium-based approach to addressing these hurdles, this talk will focus on media optimization, as over 80% of the cost of these products is projected to be from the nutrients used to grow the cells. For optimization, using both spent media analysis and AI-based efficient experimental design techniques for complex optimization problems will be discussed. In addition, initial efforts to facilitate the scale-up of processing will be discussed. While the field of cultivated meat is extremely new, many of the problems facing large-scale commercialization of this fermentation process are not. Thus, we can look to gain critical insight from decades of research in allied fields from wine to biopharmaceutical production.

BIO

Professor Block holds the Ernest Gallo Endowed Chair in Viticulture and Enology at UC Davis, as well as an appointment in the Department of Chemical Engineering. Since joining UC Davis, he has conducted research on various topics, from fermentation optimization methods to metabolic engineering of yeast for improved wine production. More recently, his research has focused on process optimization for cultivated meat production. He led the UC Davis Cultivated Meat Consortium since its inception in October 2019, and is now Center Director of the integrative Center for Alternative Meat and Protein (iCAMP), the first comprehensive center for alternative meat production globally. Prof. Block has received the Distinguished Teaching Award from the UC Davis Academic Senate, the highest teaching award given for teaching alone on the UC Davis campus. Prior to joining UC Davis, he worked for Hoffmann-La Roche, Inc. working on biopharmaceuticals, both in process development and in manufacturing. Dr. Block is a Fellow of the American Institute of Chemical Engineers (AIChE), and holds a B.S.E. from the University of Pennsylvania and a Ph.D. from the University of Minnesota, both in Chemical Engineering.