Bioengineered System Computational Modeling: Designing A Way of Improving Bioreactors | Biological Engineering

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Researchers from the Biological Engineering, Computer Science, and Biology departments have come together to design more efficient cellular factory models that address some of the issues that current systems have with nutrient delivery and waste removal.

For the last couple of decades, researchers have been developing the field of biopharmaceuticals using biological systems to create products for pharmaceutical needs. These developments have allowed biological engineers and scientists to create life-saving products like penicillin and insulin. Although the field's developments have been extremely effective at creating useful medical products, current bioreactor models are not very efficient and are often limited by nutrient delivery, waste removal, and product extraction.

In an effort to increase the productivity of cellular factories, researchers from Utah State University's biological engineering department, computer science department, and biology department collaborated to design a computer-simulated system that would utilize endothelial-like cells' ability to self-organize into vascular networks to increase the rate of nutrient delivery to producer cells and remove waste products.

Dr. Elizabeth Vargis and Ph.D. student Anna Doloman made up the research correspondents from the biological engineering department at Utah State University. The team's findings were published in the journal Frontiers in Bioengineering and Biotechnology on April 28. Their findings have demonstrated that utilizing vascularized cell factories could lead to significant increases in the productivity of bioreactor designs.

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