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Sustainable and Scalable Bioengineering Strategies for Cultivated Meat

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Abstract

The transition of cultivated meat (CM) from laboratory-scale proof-of-concept to a commercially viable industrial reality hinges on overcoming significant biomanufacturing bottlenecks [1]. This presentation will highlight a suite of bioengineering strategies designed to enable the scalable manufacturing of cultivated meat:

(a) Scaffold Innovation: The development of plant-based, scalable, low-cost, and tunable scaffolds. [2]
(b) Bioprocess Adaptation: The optimization of scaffolds for dynamic culture environments, including spinner flasks and fixed-bed reactor configurations.
(c) Nutritional Enrichment: The use of sustainable plant extracts to enhance the final product's nutritional profile.
(d) Targeted Biofunctionalization: The implementation of cost-effective and tunable surface modifications to improve cellular integration.
(e) Prototype Realization: The successful creation of hybrid cultivated meat prototypes that demonstrate the efficacy of these integrated approaches. [2]

References

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2. Murugan, P., et al., *Decellularised plant scaffolds facilitate porcine skeletal muscle tissue engineering for cultivated meat biomanufacturing.* npj Science of Food, 2024. **8**(1): p. 25.

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