

The Biopolitics of Artificial Meat and Food: Onopticon, Homovictimus, Patenting, and Regulatory Concentration in Alternative Protein Technologies

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Abstract

This article examines alternative protein technologies not merely as technical responses to environmental and ethical problems, but as socio-technical apparatuses that reorganize the production, regulation, and legitimation of food. It draws an analytical distinction among plant-based meat analogues, cultivated meat, and fermentation-based proteins, arguing that each segment generates distinct logics of concentration, distinct patent nodes, and distinct regulatory thresholds. The central claim is that the key issue is not the existence of alternative proteins as such, but the property regimes, regulatory architectures, and normative consumption regimes under which these technologies are socialized. Within this framework, **Onopticon** is theorized as a mode of power that pre-structures the field of action and thereby **imposes** a structural necessity and specific environment of choice, leaving subjects without meaningful alternatives. **Homovictimus**, in turn, designates a subject form that derives moral legitimacy and symbolic superiority from this environment. The article maps the global investment landscape—spanning from traditional agribusiness giants like Cargill to tech moguls like Sam Altman and celebrities like Leonardo DiCaprio—to show how concentrated capital reinforces these biopolitical structures. Without dismissing the environmental and ethical potential of alternative proteins, the article asks under what institutional thresholds, property architectures, and subjectivation processes these promises become materially operative.

1. Introduction

Alternative protein technologies have increasingly been discussed through two dominant narratives. The first presents them as more sustainable responses to the high greenhouse gas emissions, land use, water intensity, and animal welfare problems associated with conventional livestock production. The second evaluates them in terms of consumer acceptance, taste, price, scalability, and market growth. While both frameworks are useful, they tend to marginalize questions of property, governance, and subject formation. Yet food in modern capitalist societies is not merely a biological necessity; it is also a strategic field of regulatory statecraft, corporate capital, and population management.

The central question of this article is therefore the following: under what property forms, regulatory thresholds, and normative consumption regimes are plant-based, cultivated, and fermentation-based proteins being socialized? This question requires asking not only what these products are, but under what conditions they are made possible. The issue is not "artificiality" as such. The real issue is how a foundational domain of life reproduction is being organized in favor of particular actors, through particular expertise thresholds and particular consumption norms.

2. Method and Theoretical Ground

This study is based on a qualitative strategy of strategic case selection. The selected patents and corporate cases are included because they most clearly illuminate the nodal points through which concentration is produced. The criterion of selection is not numerical prevalence, but the structural capacity of a patent, corporate move, or regulatory document to shape production processes, market entry conditions, and property arrangements.

Theoretically, the article combines two lines of inquiry. The first is the food regimes approach, treating food as a historically constituted order shaped by states, capital, labor, and crises. The second is a biopolitical approach. Here biopolitics is not understood as an abstract metaphor for total domination, but as the management of life through food safety, labeling, production standards, product-specific risk assessment, and regulatory surveillance.

Within this article, **Onopticon** refers to a form of power that pre-structures the field of action and thereby **imposes** a specific environment of choice, leaving subjects effectively without meaningful alternatives. The distinctive feature of Onopticon is not that it completely closes the field, but that it predefines which options count as legitimate within specific property, expertise, and regulatory thresholds. **Homovictimus**, by contrast, is a subject form that reproduces its own ethical position, cultural distinction, and symbolic superiority through normative consumption, attaching to a structured environment through ethical justifications while extracting symbolic reward from that attachment.

3. Three Technologies, Three Distinct Logics of Concentration

3.1. Plant-Based Meat Analogues

Plant-based meat analogues are the most commercially mature of the three segments. In this segment, the key property nodes do not primarily concern cell biology but rather formulation, sensory imitation, structured protein processes, brand power, and shelf access. What is patented here is not merely a recipe, but the sensory totality that consumers recognize as "the meat experience." This is precisely where Onopticon becomes operative: the market is not closed, but the environment of shelf visibility, distribution, and sensory legitimacy is structured in favor of large actors.

3.2. Cultivated Meat

High capital costs, expensive inputs, complex cell biology, and product-specific regulatory dossiers raise entry barriers and thereby intensify concentration. What is patented in cultivated meat is not only the final product, but the biological infrastructure of production itself. The logic of Onopticon appears in full force: production, approval, and scale-up conditions are structured in such a way that stable participation becomes effectively possible only for actors with high capital intensity and advanced expertise.

3.3. Fermentation-Based Proteins

Fermentation is becoming not an open and dispersed innovation field, but a domain in which process ownership and component-level control are increasingly privatized. At this level Onopticon does more than regulate production; it encloses the circulation of life-sustaining components within private property environments and thereby produces effective non-alternativity.

4. Comparative Overview of the Three Segments

Segment	Principal node of concentration	Institutional/ economic threshold	Regulatory logic	Onopticon effect
Plant-based meat analogues	Formulation, sensory imitation, shelf access, branding	Medium	Comparatively lower product-specific threshold	The market environment is structured in favor of large brands
Cultivated meat	Cell lines, media, bioreactors, product dossiers	Very high	High technical compliance and product-specific safety	The field is structured around high-capacity participation, imposing a structural necessity
Fermentation-based proteins	Molecular components, process ownership,	Medium-high	Technical and supply-chain thresholds	Production logic is enclosed at the component level within

Segment	Principal node of concentration	Institutional/ economic threshold	Regulatory logic	Onopticon effect
	platform technologies			private environments

5. Corporate Strategies, Global Investment Networks, and Technology Weightings

Large firms and global capital networks investing in alternative proteins do not orient themselves toward the same technologies with the same intensity. The global landscape is dominated by the United States, which holds the highest investment volume worldwide, followed by European hubs in the Netherlands and the United Kingdom.

5.1. The Metabolic Biopolitics: From Carbohydrate Empire to Protein Monopoly

As noted previously, actors like JBS, Tyson, and Nestlé exhibit distinct strategic weightings—ranging from cultivated-protein-heavy investments to hybrid and plant-based portfolios. To fully grasp the imposing power of Onopticon, however, one must look at the actors orchestrating the foundational infrastructure of the food supply. The strategy of **Cargill**—a central actor in the global agricultural supply chain—best illustrates how Onopticon pre-structures the field of action. In 2017, Cargill became the first traditional agribusiness giant to invest in cultivated meat by backing Upside Foods (formerly Memphis Meats). It did not limit its portfolio to beef; it expanded horizontally into cultivated fish (Wildtype) and steak (Aleph Farms). This broad integration imposes a structural threshold: it ensures that regardless of which technological trajectory succeeds, the ownership and production logic remain concentrated in the same center.

Cargill's trajectory from being one of the world's largest suppliers of carbohydrates and sweeteners to a leading investor in alternative proteins marks a profound biopolitical shift. Since the 1960s, Cargill has been foundational to the carbohydrate-based modern food system. The inversion of this pyramid today—where carbohydrates are marginalized and "clean, sustainable, high-tech proteins" form the new normative core—reveals the ultimate power of Onopticon. The system not only imposes an environment of choice but continuously updates this structural necessity during moments of crisis. The very actors who engineered the previous metabolic crisis through cheap carbohydrates are now patenting and imposing its technological "solutions." The imposition of property is therefore not merely financial; it entails a molecular and technological continuity.

5.2. The Tech-Celebrity Nexus and Global Capital Flows: Strengthening the Onopticon

The Onopticon effect is further intensified by the entry of "Big Tech" moguls and celebrity capital, which provides not only financial liquidity but also ideological shielding. In the United States, the sector's most prominent backers include **Bill Gates** and **Richard Branson**, who were primary investors in **Upside Foods**—a company that has raised over \$600 million. The involvement of **Sam Altman** (CEO of OpenAI), who participated in a \$30 million round for **Uncommon** (focused on cultivated pork), signifies the "software-ization" of protein.

The scale of this concentration is evident in companies like **Eat Just (GOOD Meat)**, which has secured over \$3 billion in total investment. Such massive capital flows from entities like the **SoftBank Vision Fund 2**, **Temasek**, and the **Abu Dhabi Growth Fund** impose an environment where only high-capacity, institutionalized actors can survive. This pre-structures the market, ensuring that any "alternative" food future is born within the cradle of global finance.

In Europe, the investment logic follows a similar pattern of high-profile validation and state-level concentration. **Sergey Brin** (Google co-founder) famously funded the world's first lab-grown burger (Mosa Meat), while **Leonardo DiCaprio** has backed both **Mosa Meat** (Netherlands) and **Aleph Farms** (Israel). This "celebrity-investor" model serves as a crucial component of the Homovictimus subjectivation process.

6. The Regulatory Field: Safety Review or Political Boundary Drawing?

In the United States, market access for cultivated meat is tied not only to scientific safety, but to the capacity to construct regulatory language and documentary architecture. In the U.S. case, Onopticon operates not through prohibition, but through the creation of a technical-administrative environment navigable only by certain actors.

Florida and Alabama, however, exhibit a different regulatory logic. In Florida, SB 1084 was signed on May 1, 2024, banning the sale of cultivated meat. In Alabama, SB 23 similarly prohibited the production, sale, and distribution of food made from cultured animal cells. The Florida case also matters judicially. On March 23, 2026, the Eleventh Circuit upheld the denial of preliminary relief against Florida's cultivated meat ban and found that federal law did not automatically preempt the statute. This indicates that the biopolitical boundary drawing in Florida has been stabilized not only discursively and administratively, but judicially as well. In this context, Onopticon is best understood as an instance of state-level prohibitory environmental imposition rather than merely technical filtration.

7. The Empirical Traces of Homovictimus: Moral Capital and Tech-Utopianism

Homovictimus is empirically visible in corporate mission statements, public relations campaigns, and the broader discursive ecosystem surrounding these products. While this article does not deploy quantitative consumer surveys, a qualitative discourse analysis of brand manifestos and consumer advocacy narratives reveals a consistent pattern.

For instance, in Impossible Foods' slogan "better for the planet, and way better for animals," the modifier "way better" does not merely specify a quantitative increase in welfare; it constructs an absolute position of moral superiority. This linguistic maneuver is at the heart of the Homovictimus' discursive training, shifting the focus from measurable data to unassailable ethical identity. Such media and public relations discourse addresses the consumer not simply as a buyer of a food product, but as a subject choosing the correct ethical position. The consumer is discursively trained to derive moral legitimacy, cultural distinction, and symbolic superiority from that consent.

The presence of figures like Bill Gates, Sam Altman, and Leonardo DiCaprio allows the consumer to align their eating habits with a "progressive, tech-savvy, and ethical" identity. The "celebrity-investor" provides a symbolic template. The tragedy is that while the consumer feels they are supporting a "disruptive" start-up against "Big Meat," the underlying capital structures—funded by tech moguls and agribusiness giants alike—remain the same. Their rebellion has been financed, packaged, and **imposed** as a new normative consumption habit by the very power they sought to escape. Homovictimus is therefore not a passive victim, but an active subject who attaches to a structured environment through ethical justifications, effectively participating as a willing and morally satisfied subject in capital's new regime of accumulation.

8. Policy and Resistance Against Onopticon

Responses to Onopticon should not be framed as romantic fantasies of escape, nor should they rely on the mere goodwill of patent-holding corporations to voluntarily release their intellectual property. Concrete institutional interventions must be embedded within public administration and state agricultural apparatuses to actively fracture this monopolistic hold. Mechanisms such as state-mandated patent pools, compulsory licensing for foundational cell lines—supported, for instance, by legal provisions like 28 U.S.C. § 1498 in the U.S., which allows the federal government to use patented inventions without prior authorization under specific conditions—and strict transparency requirements for public-private R&D partnerships are necessary to enforce knowledge sharing. Relying solely on market forces will only deepen the enclosure.

Public-university shared infrastructures and cooperative fermentation laboratories, supported by models like the Netherlands' **Invest-NL** or state-backed sustainable food funds, must be reoriented from serving corporate property to building open-source public goods. When public agricultural bodies and regulatory agencies link market access to democratic food governance rather than just technical safety, the voluntary attachment produced by Homovictimus can be redirected into a more public and political register.

9. Conclusion

Alternative protein technologies cannot be treated as a single category. The problem is not that these products are "artificial," but that the future of food is increasingly being organized through patent portfolios, regulatory capacities, and normative self-governance. Onopticon allows this process to be understood not as the mere shrinking of options after the fact, but as the prior structuring of the field of action in ways that **impose** specific choices upon subjects. Homovictimus, in turn, renders visible a subject who not only consents to this environment but also extracts moral and symbolic gains from it, even as their ethical choices are enclosed by the historical architects of the world's metabolic crises and tech-utopian global capital. The conclusion of this article is thus not a fatalistic catastrophe narrative, but a diagnosis of a food future structured by strong asymmetries and yet still open to political intervention.

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