Connecting the dots: Emerging trends in microbiome-based new business opportunities

Presenter: Harini Venkataraman, Research Analyst, Lux Research

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Drive Growth Through Tech Innovation

Analysis you trust.
Opinions you rely on.
Make better decisions, faster.
Making decisions about tech innovation is complicated

An informed decision requires an understanding of:

- Market landscape
- In-depth analysis of technology
- Opportunity assessment
- Risk identification
- Value chain and competitive analysis
- Unbiased, outside perspectives

That’s where we come in.
Agenda

1 | Microbiome hot topic
2 | Trends in microbiome-based business opportunities
3 | Innovating across the value chain
The microbiome is a hot topic among scientists and consumers

- Microbiome research has exploded over the past decade, as indicated by the dramatic rise in publications on the topic (bar graph).

- The microbiome plays a complex, but crucial, role in the health of all living things.

- Consumers are showing growing interest in the microbiome as well, with internet searches growing seven-fold over five years (line graph).

- Start-ups are flocking to the space on the belief that it has the potential to drastically change the landscape of multiple industries.

The frequency of the search term “microbiome” has dramatically increased in both scientific publications and internet searches over the past decade.
The microbiome is a hot topic…also among pets

Just a another cute cat?
Internet sensation Lil Bub

Not really !!!
Internet sensation Lil Bub

“Thanks to a recent collaboration with AnimalBiome, KittyBiome, and Phase Genomics, Lil BUB helped discover 22 new microbes living in cats which, in time, could reveal new insights into cat health and happiness.”
Microbiome technologies impact five major industries

- Food
- Agriculture
- Medicine
- Personal care
- Animal health
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- Agriculture
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Microbiome in food: Technology developments

- **Tech developments**
  - Identification of the bacteria that make up the gut microbiome is changing our fundamental understanding of how we as humans respond to our food
  - We now know that the microbiome plays a critical role in human health and wellness, and specific diets can significantly alter an individual’s microbiome signature
  - This new understanding unlocks significant opportunities for new foods, ingredients, and supplements that target gut microbe health

- **Start-up activity**
  - Most start-ups and small companies targeting the food industry provide prebiotics and/or probiotics.
  - Some employ B2C model, while others sell ingredients to food and beverage manufacturers
Microbiome in food: Corporate strategy moves

• Many large ingredients suppliers are getting active in the microbiome space, offering probiotic and prebiotic ingredients to the food industry

• Large food companies like PepsiCo and Nestlé are looking to formulate prebiotics and probiotics into their finished products

• Major industry players are spending on internal R&D and seeking significant partnerships

• For marketing to consumers, the focus is on demonstrating the efficacy of microbiome-modulating products as a differentiator
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A number of players continue to develop products containing probiotics due to consumers' positive notion of the associated health benefits.

Pre- and probiotics are incorporated as functional ingredients into food products and beverages.

Suitable formulations ensure the viability, survival, and stability of probiotics in the application of interest.
Example developer: NextFoods
Producer of GoodBelly, a probiotic beverage

History

- Incorporated in 2007, NextFoods produces the brand GoodBelly, a nondairy line of probiotic beverages
- The company has raised $40 million to date, with its most recent funding round of $12 million completed in June 2018, led by General Mills

Technology and strategy

- NextFoods produces GoodBelly, a nondairy line of probiotic beverages using *Lactobacillus Plantarum* 299v (LP299V) sourced from Probi
- Has exclusive rights to the LP299V strain, backed by 18 clinical trials demonstrating probiotic status
- Products contain at least 20 billion colony-forming units (CFU) with shelf life of 85 days

Lux Take

- Positive: NextFoods offers an attractive, science-backed probiotic drink with solid brand recognition
Microbiome research as a key to unlock personalization?

Incorporation of prebiotics and probiotics in food and beverages

B2C consumer facing business models

Microbiome analysis coupled with personalized nutrition and supplements
Microbiome and Personalized Nutrition
Personalized nutrition:
the sciences, technologies, and products that provide consumers with individualized dietary recommendations
Personalized nutrition solutions include many technologies offered at several levels of specificity
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Example developer: DayTwo
Microbiome-based personalized nutrition app

History
- The Israeli company DayTwo incorporated in July 2015 and bases its personalized nutrition product on an algorithm license from the Weizmann Institute; algorithm based on clinical trials with 1,000 participants.

Technology strategy
- DayTwo provides personalized dietary recommendations to prediabetic and diabetic consumers based on the microbiome signature.
- Single kit costs $399 and includes microbiome sequencing testing, report, and personalized nutrition app; plans to commercially launch kits early in 2017.
- Current focus is on business-to-consumer (B2C) market, but plans to enter the business-to-business (B2B) market in the future.

Lux Take
- Wait and see – this is a unique and compelling solution, but DayTwo will need to demonstrate that its recommendations are effective in regulating blood glucose levels.

Summary information

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<tbody>
<tr>
<td>Founded in</td>
<td>2015</td>
</tr>
<tr>
<td>Location</td>
<td>Israel</td>
</tr>
<tr>
<td>Employees</td>
<td>15</td>
</tr>
<tr>
<td>IP</td>
<td>Licensed from Weizmann Institute</td>
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Emerging opportunities

• Understanding of the microbiome has increased dramatically over the past decade, yet developers have barely scratched the surface

• The microbiome has the potential to unlock a new layer of personalization

• Advancing microbiome research will affect how we approach personalization

PREDICT study
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The microbiome space continues to grab industry attention

- A growing body of scientific evidence has established the interplay between probiotics and the host microbiome

- The prebiotics and probiotics space continues to generate significant commercial interest

- Food and ingredient companies, along with other players in the value chain, are actively looking for ways to expand their portfolios to incorporate products that benefit the microbiome

Top activities in the probiotics space 2018

<table>
<thead>
<tr>
<th>Company</th>
<th>Acquired by</th>
<th>Deal Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>BioCare</td>
<td>DSM</td>
<td>$44 million</td>
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<tr>
<td>Atrium Innovations</td>
<td>Nestle</td>
<td>$2.3 billion</td>
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<td>Protexin</td>
<td>ADM</td>
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<td>General Mills</td>
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<td>Bill &amp; Melinda Gates Foundation</td>
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<td>thryve</td>
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Microbiome is set to impact the entire food value chain
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How do opportunities in the microbiome space align with major consumer preferences?
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- Production agriculture
- Food ingredients
- Food and beverage products
- Consumer impact

Food for health
Convenience
Personalization
Ingredients
How do opportunities in the microbiome space align with major consumer preferences?

- Production agriculture
- Food ingredients
- Food and beverage products
- Consumer impact

**Food for health**
- Ganeden

**Convenience**
- Yakult
- NextFoods

**Personalization**
- MicroBiome therapeutics

**Ingredients**
- InocuCor Technologies
- Azotic Technologies
- Unibiome
How to approach this space?
Key Takeaways

1. When partnering, look for companies that deliver ingredient or formulation innovation that suits the products you develop.
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<td>Look for ways to innovate up and down the food value chain, keeping the final consumer impact in mind</td>
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Thank you!
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