DNA Testing: Understanding Results and Exploring Opportunities

Ali Mostashari, PhD, CEO, LifeNome Inc., U.S.
The Age of Personalized Wellness

Artificial Intelligence, Genomics, and the Data-driven Health and Wellness Revolution

Ali Mostashari, Ph.D.
CEO, LifeNome
A PARADIGM SHIFT IS BREWING IN WELLNESS

JUST WITHIN THE PAST 3 YEARS...

Personal Biological Data (DNA + Microbiome) + Personal Physiological Data (Wearables) + Personality Data and Behavioral Science + Artificial Intelligence and Machine Learning

ADVANCES IN SCIENCE AND ARTIFICIAL INTELLIGENCE HAVE ENABLED TRUE PERSONALIZATION OF WELLNESS PRODUCTS AND SERVICES
DEMAND FOR PERSONALIZATION PASSING TIPPING POINT

WOULD CHOOSE A BRAND OVER ANOTHER IF THEY PROVIDED ME THE FOLLOWING PRODUCTS AND SERVICES THAT ARE PERSONALIZED FOR ME BASED ON MY DNA....

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplements</td>
<td>71%</td>
</tr>
<tr>
<td>Corporate Wellness</td>
<td>57%</td>
</tr>
<tr>
<td>Weight Loss</td>
<td>55%</td>
</tr>
<tr>
<td>Skin Care/Cosmetics</td>
<td>54%</td>
</tr>
<tr>
<td>Fragrances</td>
<td>42%</td>
</tr>
</tbody>
</table>

Source: LifeNome – Columbia University U.S. National Survey of Attitudes Towards DNA-based Personalization, July 2017
BIOLOGY: ULTIMATE FRONTIER OF WELLNESS PERSONALIZATION

U.S. Consumers with DNA Data

1 Million (2014)
3 Million (2015)
5 Million (2016)
9 Million (2017)
15 Million (2018)
25 Million (2019)
40 Million (2020)

GLOBAL WELLNESS ECONOMY:
$3.7 trillion in 2015

Note: Numbers may not add due to overlap in segments.
Source: Global Wellness Institute, Global Wellness Economy Monitor, January 2017
AI + BIOLOGICAL DATA + BEHAVIORAL DATA = PERSONALIZED WELLNESS

From “Galaxies” to “Planetary Systems”: Digging down into process-level clusters
PERSONALIZATION EXAMPLE: NUTRITION

Generic User

**Nutrition Facts**
Lean Shake, Swiss Chocolate - GNC
Total Lean
Serving Size: 2 scoops (48g)

<table>
<thead>
<tr>
<th>Amount Per Serving</th>
<th>Calories 180</th>
<th>% Daily Value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fat 2g</td>
<td>12%</td>
<td></td>
</tr>
<tr>
<td>Saturated Fat 0g</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Cholesterol 5mg</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Sodium 350mg</td>
<td>12%</td>
<td></td>
</tr>
<tr>
<td>Potassium 0mg</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Carbohydrates 30g</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>Dietary Fiber 8g</td>
<td>32%</td>
<td></td>
</tr>
<tr>
<td>Sugars 5g</td>
<td>32%</td>
<td></td>
</tr>
<tr>
<td>Protein 9g</td>
<td>20%</td>
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* Percent Daily Values are based on a 2000 calorie diet.

Dr. Raya Khanin
Co-Founder of LifeNome

**Nutrition Facts**
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Dr. Ali Mostashari
Co-Founder of LifeNome
PERSONALIZATION EXAMPLE: DIET AND WEIGHT LOSS

9 Million
U.S. Consumers with DNA Data by end of 2017
72% Interested in DNA-based Weight Loss and Nutrition Personalization
(Source: Columbia University-LifeNome National Survey 2017)

33%
Increase in Weight Loss Effectiveness
Over 12 months given same calorie restrictions for individuals on DNA-based weight loss compared to individuals on generic diets
(Source: University of Trieste Study, 2014)

30%
Increased adherence to recommendations
for individuals on DNA-based nutrition advice compared to those on generic advice
(Source: University of Trieste Study, 2014)
# Personalization Example: Skin Care

## Willa's Genetic Skin Profile

<table>
<thead>
<tr>
<th>Condition</th>
<th>Product 1</th>
<th>Product 2</th>
<th>Product 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased collagen breakdown</td>
<td></td>
<td>★</td>
<td>×</td>
</tr>
<tr>
<td>Decreased pollution defense</td>
<td>×</td>
<td>★★★</td>
<td></td>
</tr>
<tr>
<td>Decreased skin detoxification</td>
<td>★</td>
<td>★</td>
<td>×</td>
</tr>
</tbody>
</table>

*Best for Willa!*

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*Image and products are for illustrative purposes only.*
PERSONALIZATION EXAMPLE: PRODUCT PLANNING AND MARKETING

Factors that determine our taste and smell preferences:
Genetics, Gender, Age, Life stage, Peer feedback, Socioeconomic status, Geography, Culture

- SuperTasters (Genetic Bitter Taste Sensitivity)
- Younger
- More Female
- Ethnically Diverse
- Lower alcohol tolerance
- Lower alcohol addiction tendency

- Slightly Older
- Tasters (Genetic Bitter Taste Sensitivity)
  Ethnically More Diverse
  Slightly More Male
  Higher alcohol tolerance
  Lower alcohol dependence tendency

- Nontasters (Genetic Insensitivity to Bitterness)
- Older
  Significantly More Male
  Higher proportion of whites
  Higher alcohol tolerance
  Higher alcohol dependence tendency
GOING BEYOND FADS: SCIENCE MATTERS

IN THE NEXT 1-3 YEARS...
PERSONALIZATION WILL TAKE THE MARKET BY STORM,

POOR (SUPERFICIAL APPLICATION OF) SCIENCE (PARTICULARLY PART OF THE GENETIC FRENZY) WILL DETERIORATE PUBLIC TRUST AND FIZZLE OUT.

AFTER THE INITIAL GOLD RUSH PERIOD...
WHAT MATTERS LONG-TERM IS PROOF OF EFFECTIVENESS AND VALIDATION.
WAITING OUT TO SEE IF SOMETHING IS A FAD OR A PARADIGM SHIFT IS RISKY BUSINESS.

FIND SUBSTANTIVE DISRUPTORS AND CREATE PARTNERSHIPS WITH THEM.