Precision Nutrition

Driving the Scientific Journey…

Sangeetha Srinivasan

Vice President Health & Wellness, Camlin Fine Sciences   Sep 12 2023

Synopsis

Precision Nutrition promises great growth potential attracting <u>investors, start-ups, FMCG companies, tech providers and ingredient suppliers</u>...It is a <u>premium segment </u>in the Nutrition industry accessible to the <u>high-end consumers</u>. "Will it reach the mass?" depends greatly on scale and business outlook of key stakeholders...The ruling elements will continue to be <u>technology, science and ethical products</u>!
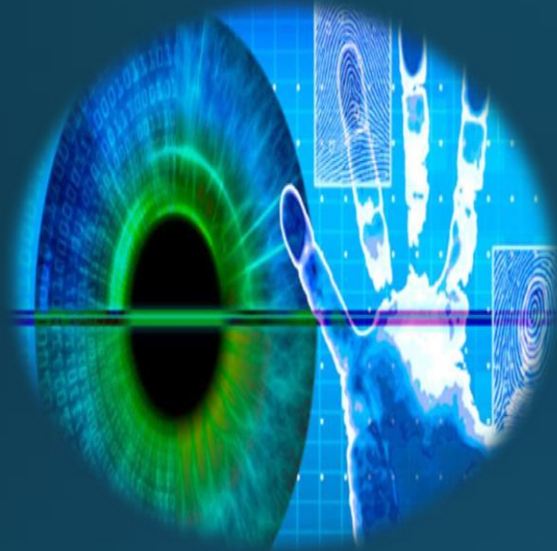
System security ≈ Health security

Precision / personalized nutrition focuses on **human variability** to design tailored **Dietary / nutritional intervention** to improve health

Precision Nutrition Industry

- Valued at USD 8.1 Bn in 2020 & estimated to be USD 19.7 Bn by 2027
- > 500 companies – primarily start-ups and few established players
- Microbiome is the fastest growing segment
- Success in products limited to Supplements rather than foods
- Business models – Personalized E grocery, nutrition, subscription meal service & gastronomy
- Circular value chain with consumer at the center

Academy of Nutrition and Dietetics calls caution!!!!
"The practical application of nutritional genomics for complex chronic disease is an emerging science and the use of nutrigenetic testing to provide dietary advice is not ready for routine dietetics practice"

Science
Ex:
- Stronger link between Microbiome & metabolic response

Technology
Ex:
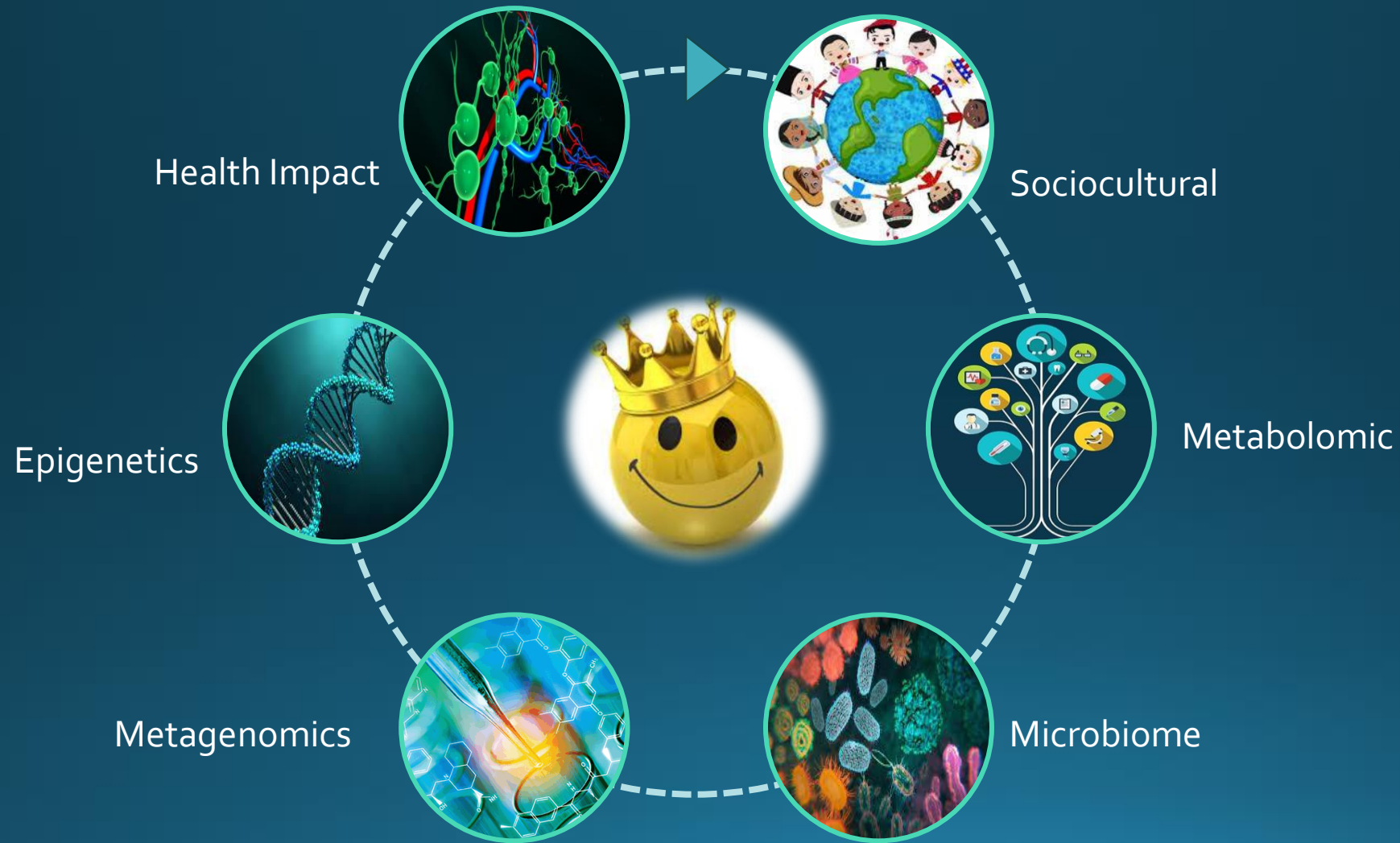- Stronger data: collection, analytics & integration
- Apps

Products
Ex:
- In home / DNA testing kits
- Wearables ($28 Bn)
- Supplements

Key Stakeholders
• Data collection / analytics companies
• Supplement manufacturers
• Device manufacturers
• Fitness studios
• FMCG companies

Critical Success Factor = Omic Sciences + Technology + Analytics = DATA = PRODUCTS

Health Impact

Sociocultural

Epigenetics

Metabolomic

Metagenomics

Microbiome

Business Operation – Example

Home test kit

Questionnaire

DNA test kit

App

Recommendation

Supplements /
*3D printed food

*3D printed food / supplements
allow control to add into foods &
supplements

Data collection &
Analysis

Tracking

Tracking

Key Players

- Nourished
- Care/of
- Viome
- Panaceutics Nutrition
- Baze
- Lykon
- InsideTracker
- Levels Health
- Hologram Sciences (DSM)

Omega 3 – Precision Nutrition Journey

- Omega 3 Index test – Measures the amount of Omega 3s EPA /DHA in the blood

- Recent inclusion – Prenatal DHA test

- Invented in 2004 as an objective way to measure Omega 3 intake

- Since 2004, 100 papers featuring omega 3 index have been published in medical / scientific literature

- Rationale for omega 3 index as a new risk factor for CVD has been cited in over 700 papers

- Helps in personalizing Omega 3 dosage through supplement route

Snapshot of Advances / innovations

Lab-on-chip

High parallelization & diagnosis, 100s of tests at the same time; Ease of use; Accuracy / reduction of human error; fast response time

Artificial Intelligence

Analysis of massive real-world data collected using wearables or diagnostic tools to better detect patterns and predict health trajectories

Mouth Wearable

The sensor can wirelessly report salt consumption to an app, helping users manage the amount of sodium in their diets. Similarly, Tufts University researchers developed a tooth-mounted sensor that detects glucose, salt, and alcohol intake.

Allergy Amulet

A portable food allergen sensor. The device signals if an allergen is present by analyzing a disposable test strip which has a sample of food on it.

Market Examples...

Nutrino

Uses AI to help recommend a dietary plan based upon a number of physiological signals from the user, such as stress and activity levels.

Oviva

Offers a behavior change platform targeted at users with conditions including obesity, diabetes, and food allergies. Through Oviva's mobile app, users can track activities and communicate with dietitians for guidance.
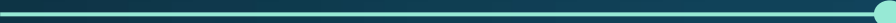
23 and Me

Gene based food recommendation through saliva sample

Nourished 3D

Develops 3D-printed compartmentalized supplements that layer different mixes of active ingredients, which are specifically suited to the consumer's individual requirements.

3D printed Nutristacks

2 minutes consultation questionnaire – generates recommendations for 7 layered nutrients based on proprietary algorithm. The system uses proprietary 3D file and a movement instruction file within the 3D printer—this tells the printer what to create, how to move, and when to deposit the gummy material

WIDESPREAD ADOPTION OF PRECISION NUTRITION

- Next-generation wearables allowing real-time continuous collection of nutrition and health data
- Integration of personalization with preventive and therapeutic healthcare systems
- Democratization of precision nutrition and incorporation into public health policies

INCREASING MULTIOMIC INTEGRATION

- Gut microbiota predicts glycemic responses
- Phenotypic flexibility as hallmark of health
- AI and systems biology applied to nutritional diagnosis and interventions
- NIH Nutrition for Precision Health initiative

SINGLE FOCUS ON NUTRITIONAL GENOMICS

- Inborn errors of metabolism
- Genetic factors linked to food allergies, intolerances, and sensitivities
- Early personalized nutrition recommendations based on gene-nutrient interactions

Growth Retarders
• Scientific substantiation
• Data privacy
• >70,000 websites offer health info
• Information Vs opinions
• High cost = high price = high expectation
• Multi-stream collaboration
• Engagement with HC professionals
• Regulatory framework – to maintain consumer trust & integrity

Concluding Observation: "We know Next to Nothing"

– Institute for Advancing Health through Agriculture and Department of Nutrition Science, Texas A&M University, College Station, Texas, USA;

"Now is the time to pause – now is the time to collect the requisite data – now is the time to admit that we know next to nothing about to how to implement precision Nutrition. We need investment in better methods to assess exposure and then to assess how the exposure manifests in disease. Currently we have weak methods for exposure assessment and as a scientific community we suspend disbelief on the black box between exposure and outcome"

The average attention span during a presentation is 10 minutes,

Thank you!