

PEPSICO

Global R+D

Jonathan McIntyre

SVP R&D Global Beverages



Jon Likes Quotes and Movie Lines

“Necessary but not sufficient”

“How is that working for you”

“No hill for a stepper”

“Let’s just act like our jobs depend on getting this right”

“I’m from Missouri, the Show Me State, so show me the data”

“Our goal is to eliminate art and make it science”

“Back off man, I’m a scientist”



Performance with Purpose – The Promise of PepsiCo



Delivering Our Performance with Purpose



**“Performance with Purpose
is at the foundation of
every aspect of our business.
We integrate a commitment to
human, environmental and
talent sustainability into all
of our operations.**

– Indra K. Nooyi

Good Business Is Good for All



Performance with Purpose

The Promise of PepsiCo

...is not a stand-alone initiative. Our sustainability goals across the four planks are woven into the fabric of our brands, and strengthened by our partnerships and the Power of One.



Delivering Performance with Purpose



Environmental Sustainability

Be responsible stewards of our planet's resources



Talent Sustainability

Involving & empowering people to realize their potential, renew themselves and achieve success



Human Sustainability

Nourish consumers with a range of products



Encouraging People to Live Healthier



Human Sustainability



World Nutrition Challenge

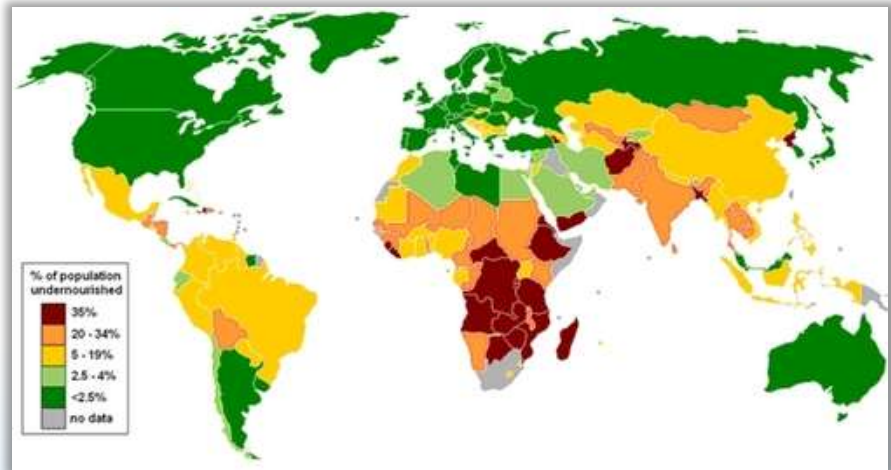


PEPSICO
Global R+D

OVER Nutrition



UNDER Nutrition



Human Sustainability Commitments



PEPSICO
Global R+D



Increase
the amount
of whole grains,
fruits, vegetables,
nuts, seeds and low-fat
dairy in our global
product portfolio

Reduce the average amount of:

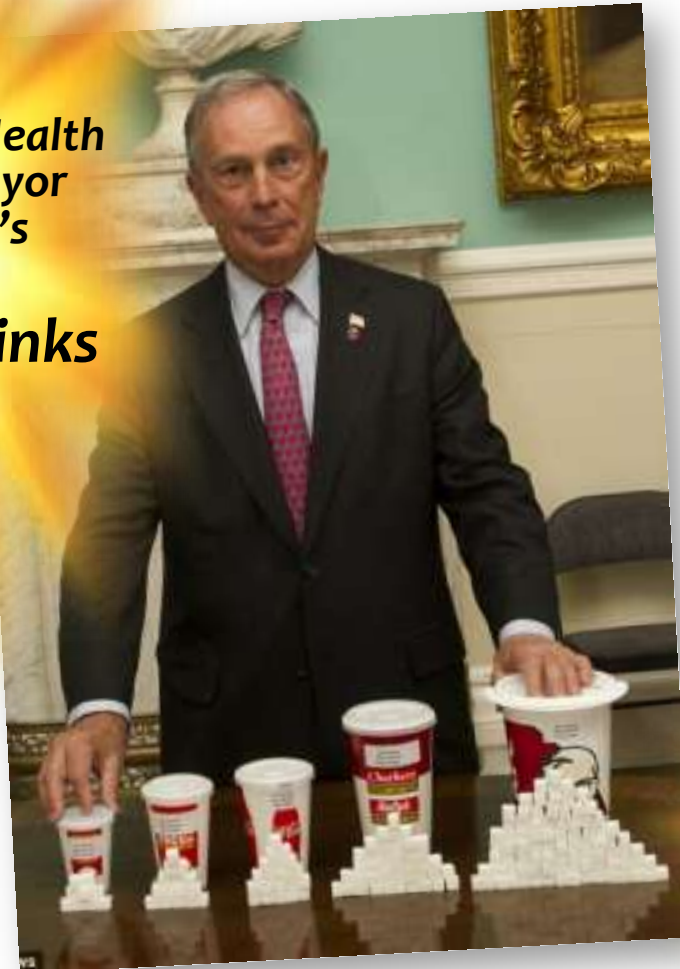
- **Sodium** per serving by **25%**
- **Saturated fat** per serving by **15%**
- **Sded sugar** per serving by **25%**



New York City Ban on Beverages > 16 oz

NYC Anti-Soda Ad, June 2012

**Sept 13:
NYC Board of Health
approved Mayor
Bloomberg's
ban on
sugared drinks
> 16 oz**

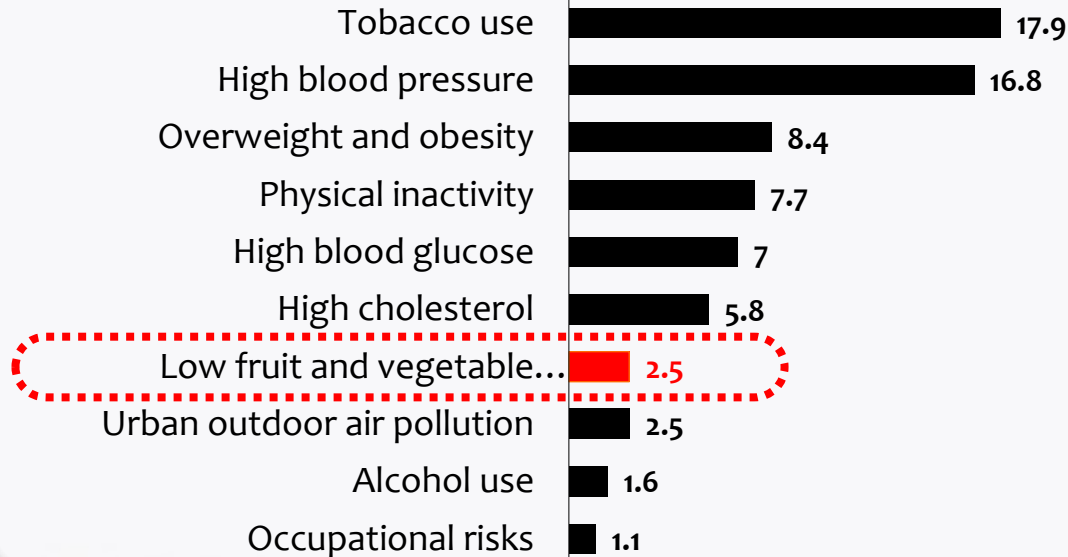


**... cutting sugared beverage
consumption the keystone
of his anti-obesity strategy
and his legacy**

Increasing global F&V servings at least one per day...

More than a noble cause, it is a worldwide health imperative!

(Percent of Mortality)



3.8% global mortality attributable to low intake of F&V

2.7 million lives could be saved each year with 600 g/day F&V



Diverse Portfolio

Fun-for-You Portfolio



Better-for-You Portfolio



Good-for-You Portfolio



22 PepsiCo Billion-Dollar Mega Brands

FUN-for-You



Better-for-You



GOOD-for-You



Indra's Challenge to Me



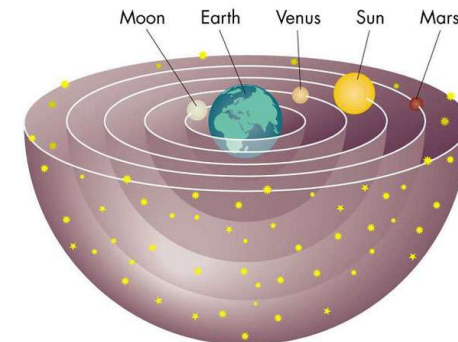
“Jonathan, I don’t need more colors and flavors of Mountain Dew and Gatorade, I need a transformation of the beverage portfolio and we need a different scientific approach”

Traditional Approaches

- Product development led
- Tastes good



- Product and package development led
- Looks good



SENSORY

Perception of Beverage



- Difference Testing
- d /analysis, Traditional R-index, MultiMatch™
- Targeted Descriptive Analysis, Descriptive Analysis

CONSUMER

Fulfillment of Expectations, Purchase Intent, Liking



CLT, HUT, CPD

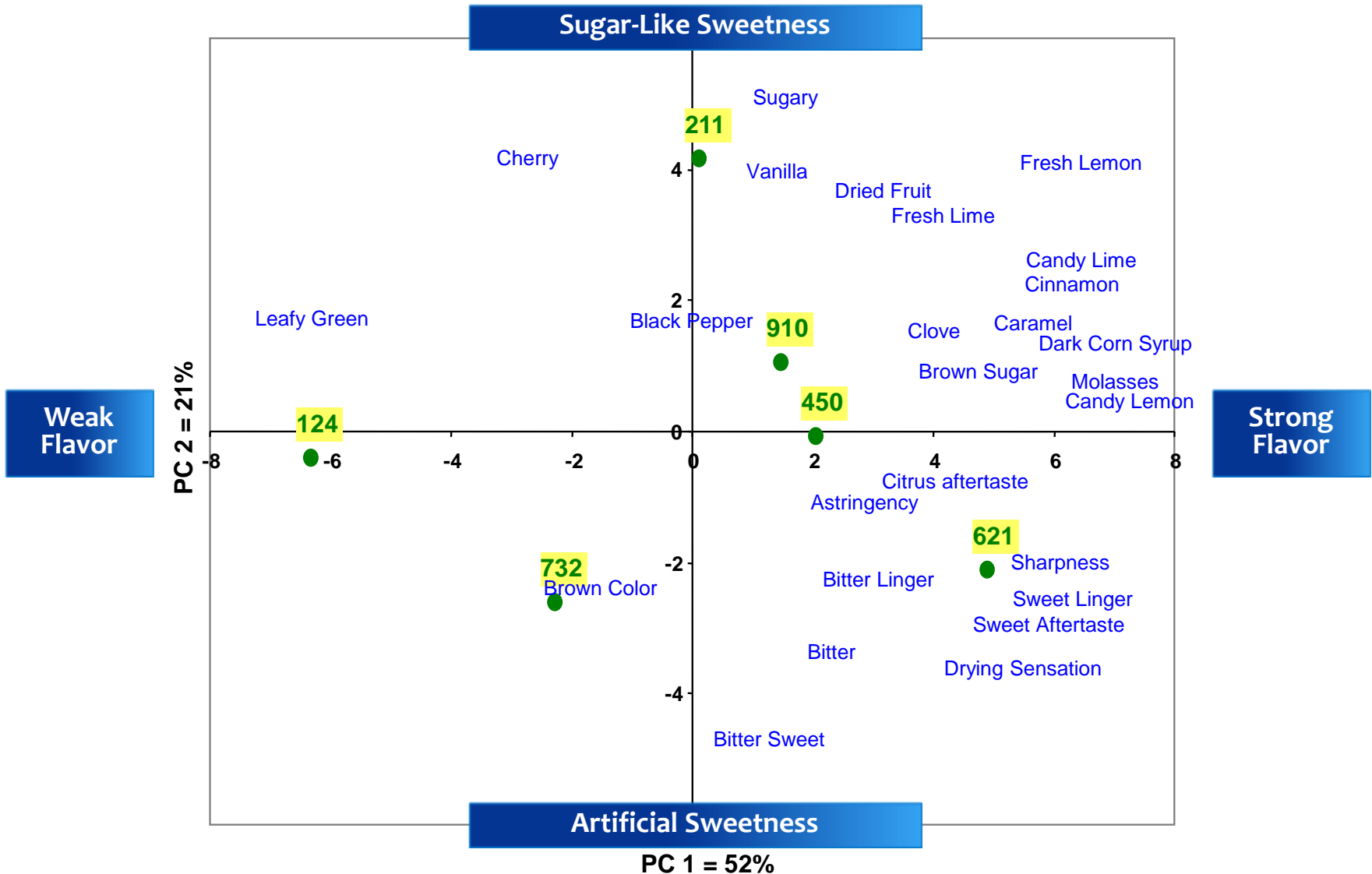
Focus Groups, Live Labs

Sensory and Consumer Scientists

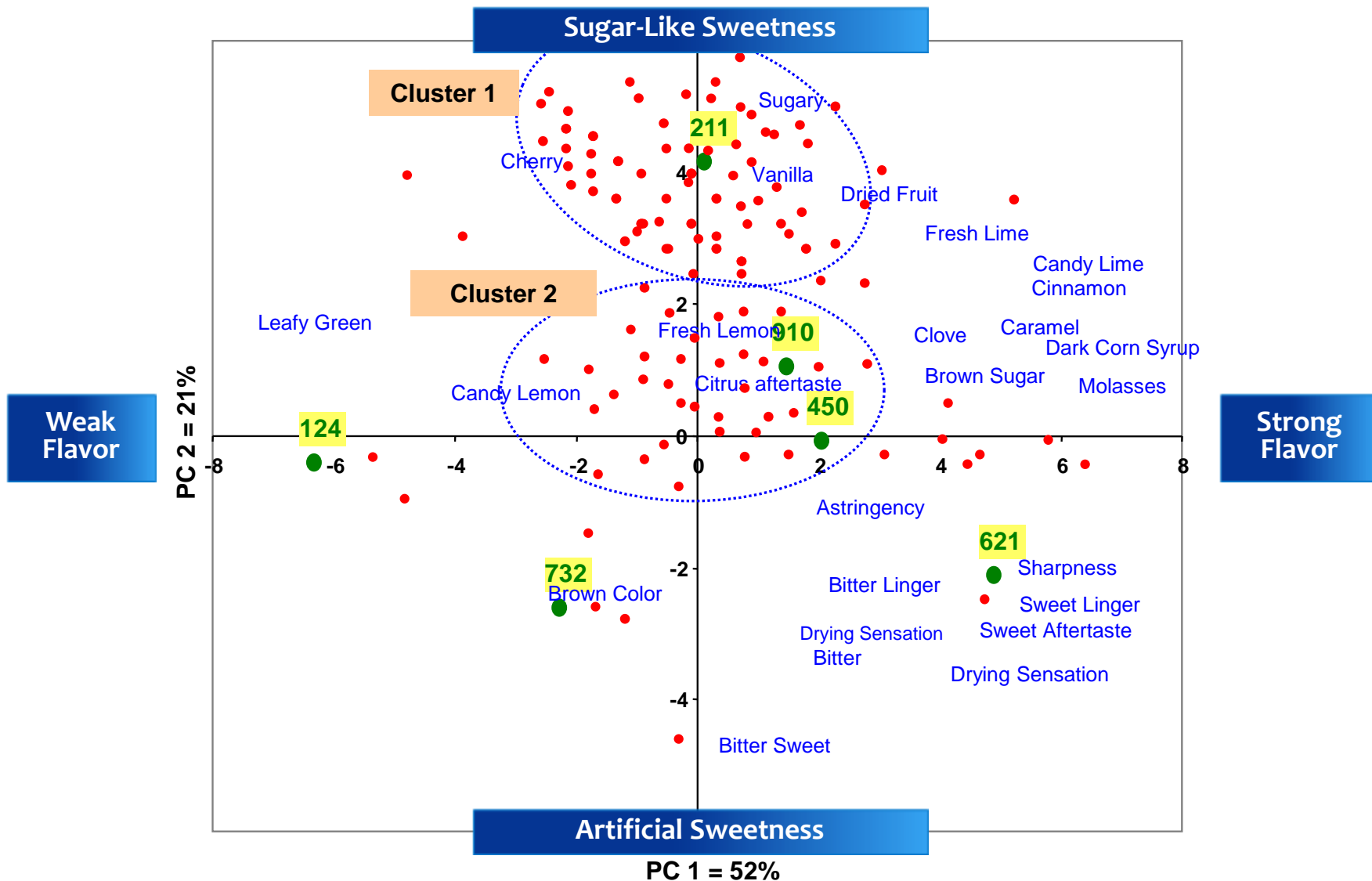
- **Guide PD** and Marketing partners to create consumer-desired products
 - **Help** them understand product perception from consumer POV
 - **Provide** research design expertise, statistically link sensory and consumer results, and provide interpretation of data
- **Influence** to integrate concept and prototype development into a holistic process
 - Increase success rate
 - Speed development



Sensory Map of Prototypes



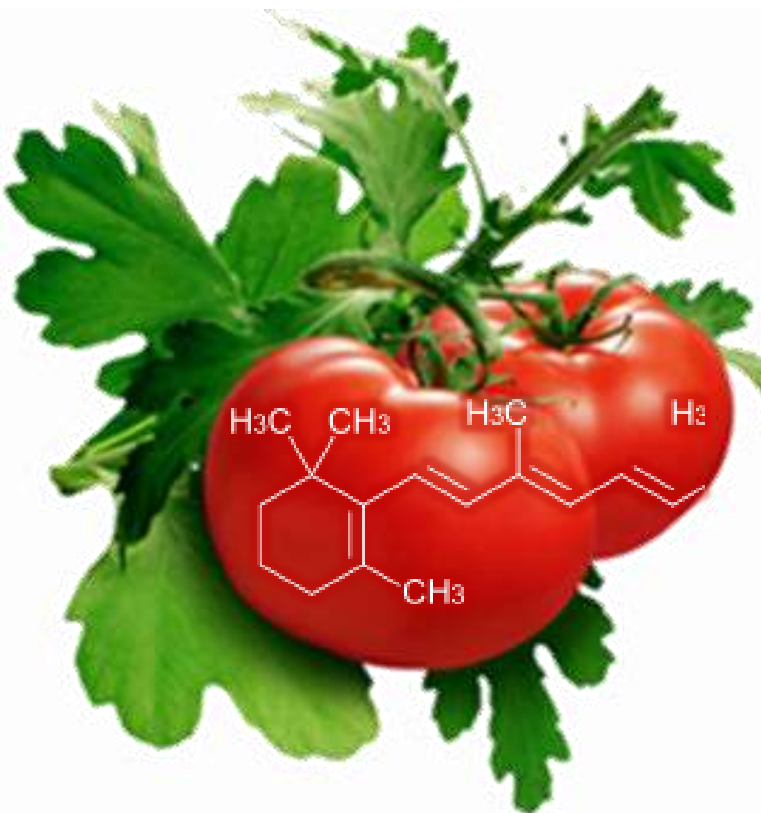
Optimization Guidance based on Consumer Segments



The Results



The New Approach: Technology



It Is All About Science and Technology !!!

Minimize Negatives

- Sugar
- Fat
- Sodium
- Bitterness
- Artificial Ingredients



TECHNOLOGY UNLOCKS:

- Zero/Reduced Calorie Sweeteners
- Fat Replacers
- Advanced Salt Reduction
- GNC Fat Level Processing
- Bulk Sugar Replacer

Natural Solutions

- Preservatives
- Sweeteners
- Colors
- Processing



- Natural “Zero Calorie” Sweeteners
- Natural Colors & Preservatives
- Natural Flavor & Maskers
- Processing, e.g. Aseptic & High Pressure
- Advanced Delivery Systems

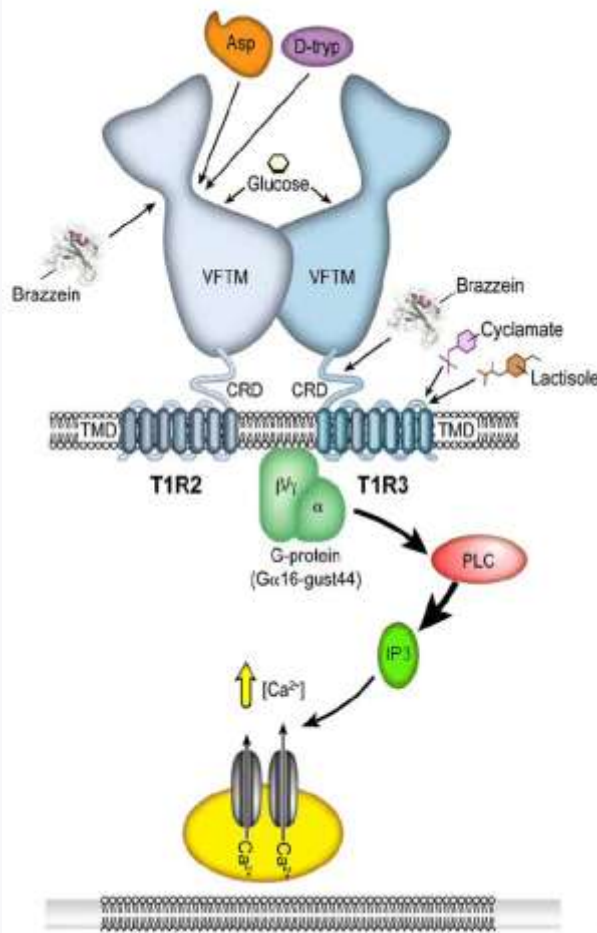
Whole Foods Nutrition

- Fruits + Vegetables
- Whole Grains/ Fiber
- Dairy
- Protein



- Advanced Agro Research
- Nutrient Retention
- Prolonged Fresh
- Multi-texture
- Package Barriers

Receptor Based Ingredient Discovery Searching for the Needle!



Assadi-Porter et. al. BBA 2009

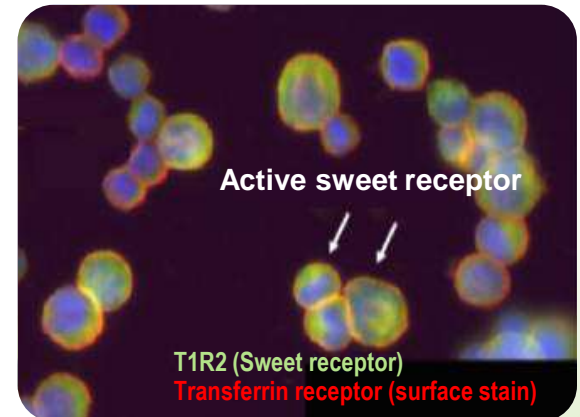
- C class G Protein Coupled Receptor
- 8,000 reported sweet compounds
- Several blockers
- Cola's ~ 0.3 M sugar
- Located in
 - Taste buds
 - Gut
 - Brain
 - Pancreas

From Extracts to New Taste Breakthroughs

NEW high-THROUGHPUT screening



NEW high-CONTENT screening



Screening robot identifies extracts that trigger critical taste receptors (sweet, salt, fat, bitter)

Linking Capabilities with R&D Product Development Experts

Product Development Team

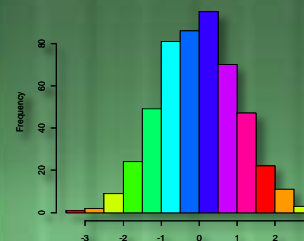
Analytical
Chemistry



IT/
Informatics



Statistics/
Data Modeling



Metabolomics → Marker Assisted Breeding

GOAL: Improve yields of Stevia through natural, selective breeding

Existing Line 1



+

Existing Line 2

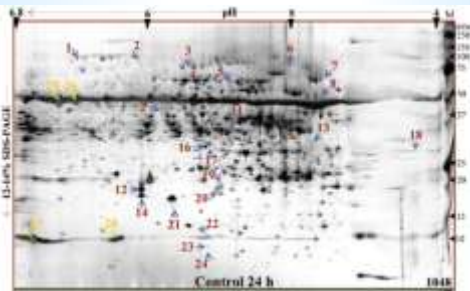


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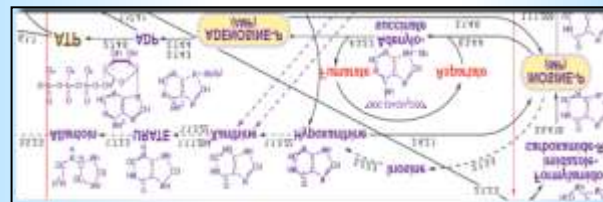
New Line



CHALLENGE: Which lines should be selected for breeding?



Genes + Metabolites



Biochemical Pathway
Knowledge Map



Desired Phenotype

The Result!



Evolving the Approach with New Knowledge

Flat Earth

1



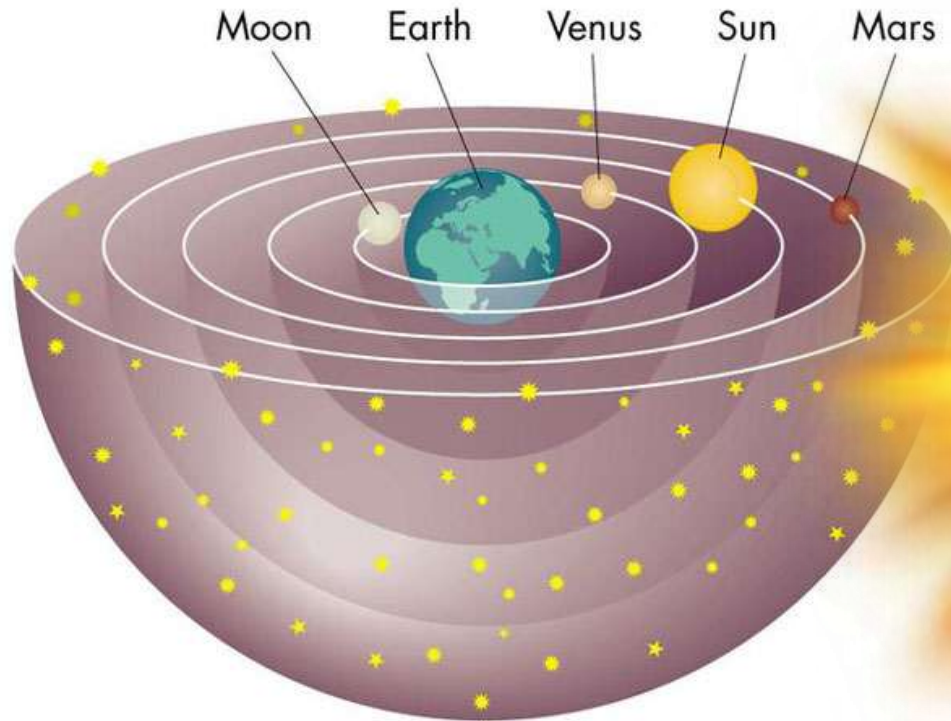
PD
in the
LEAD



Evolving the Approach with New Knowledge

Earth Center of Solar System

2



**PD &
Package**
in the
LEAD



Evolving the Approach with New Knowledge

Earth Revolves Around The Sun

3



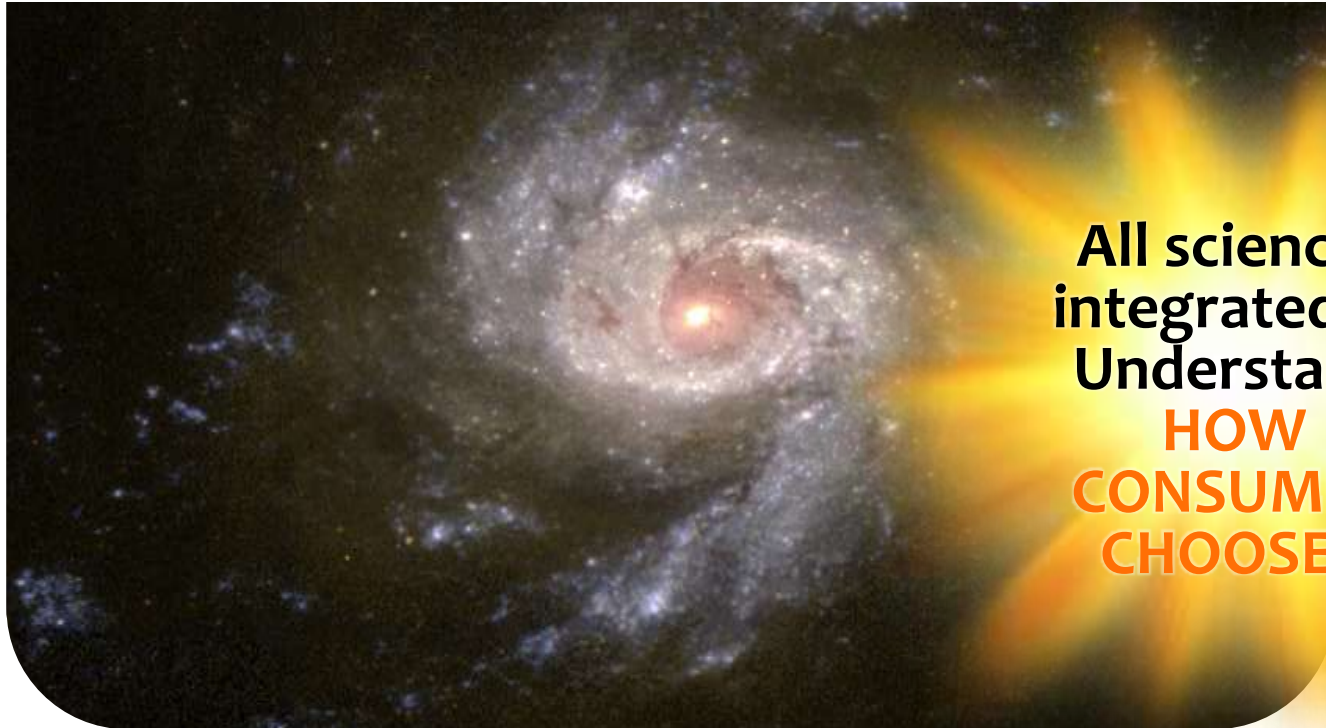
Technology
in the
LEAD



Evolving the Approach with New Knowledge

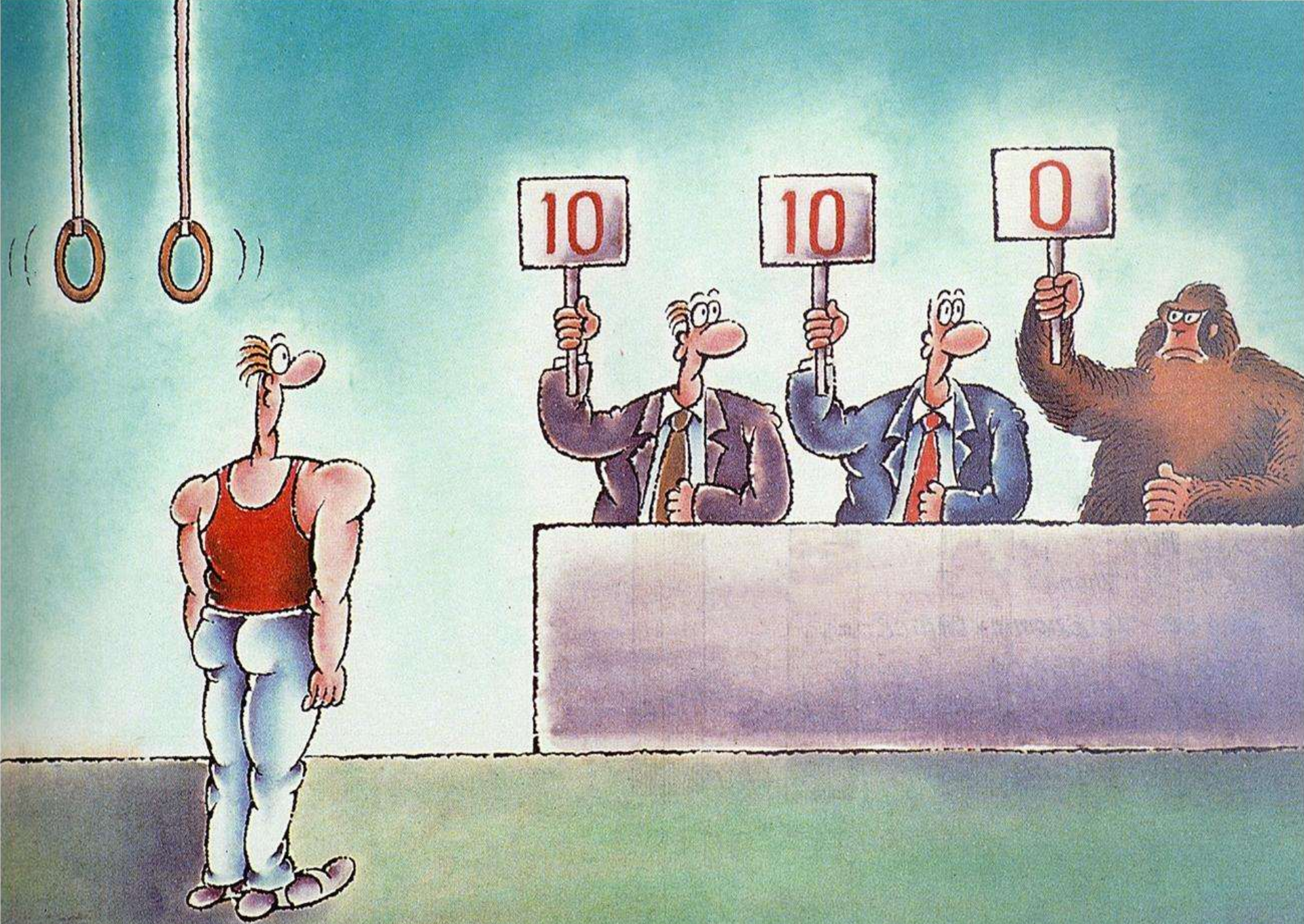
Galaxies & Expanding Universe

4

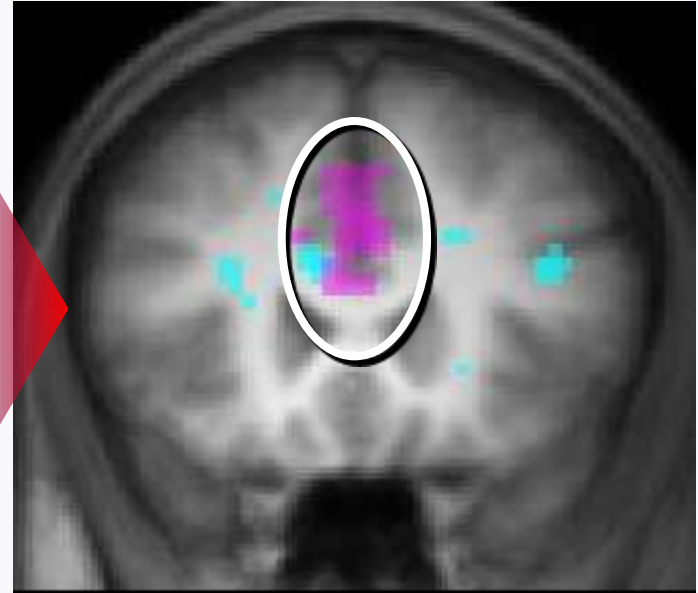
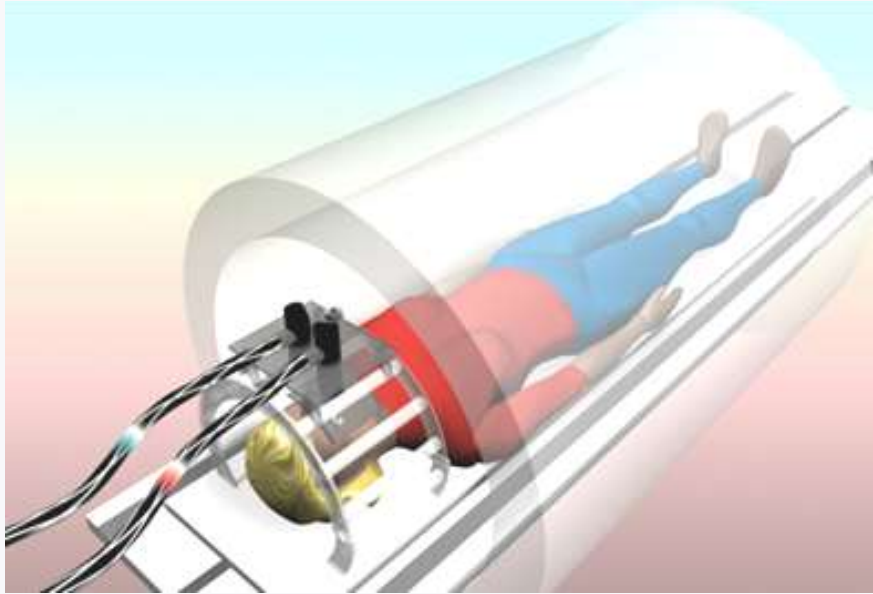


All sciences
integrated to
Understand
**HOW
CONSUMER
CHOOSES**





NEUROBIOLOGY and Sensory Science?



People taste a
beverage after
being told “treat”
or “healthy”

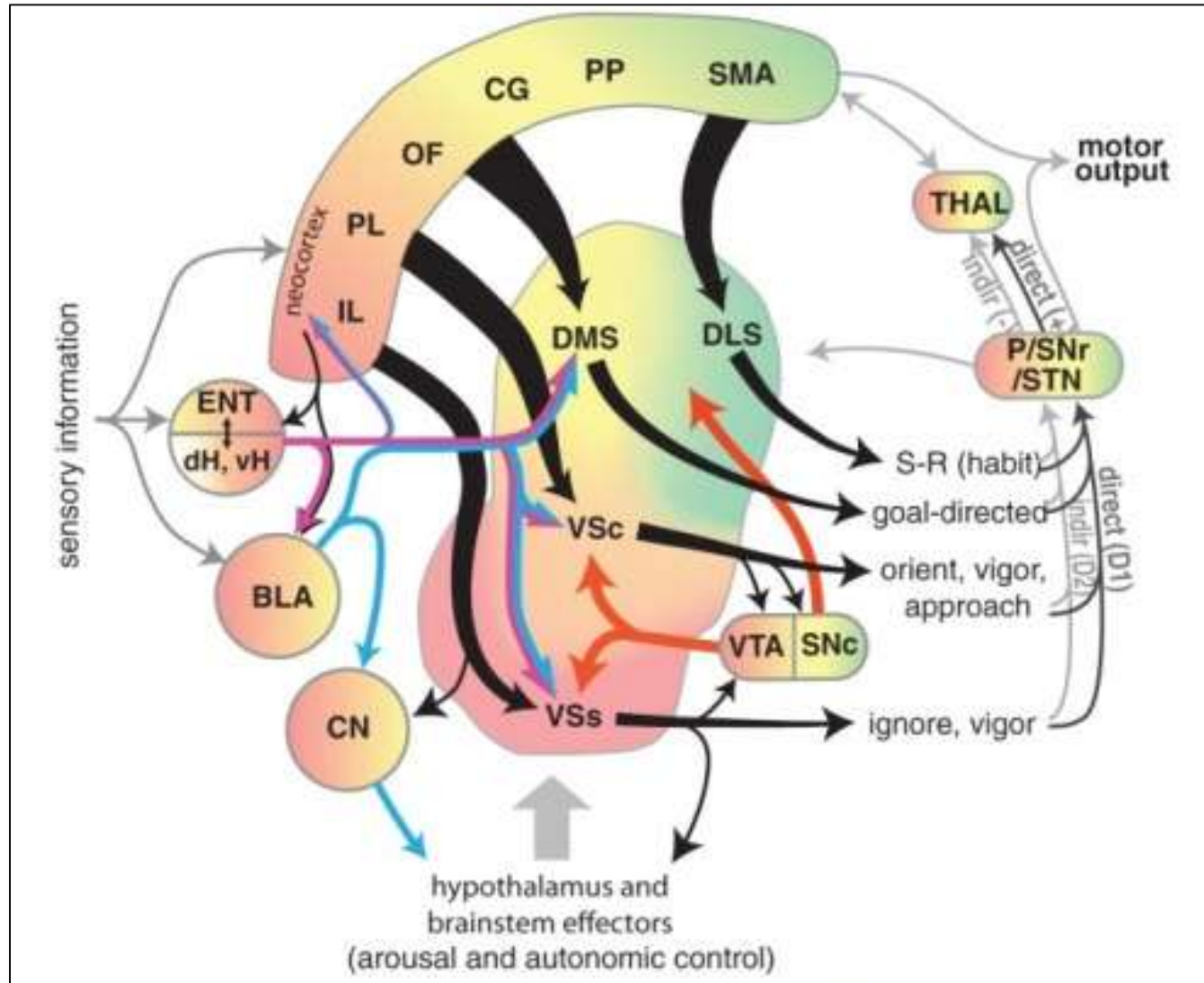


Rate Pleasantness
of Beverage

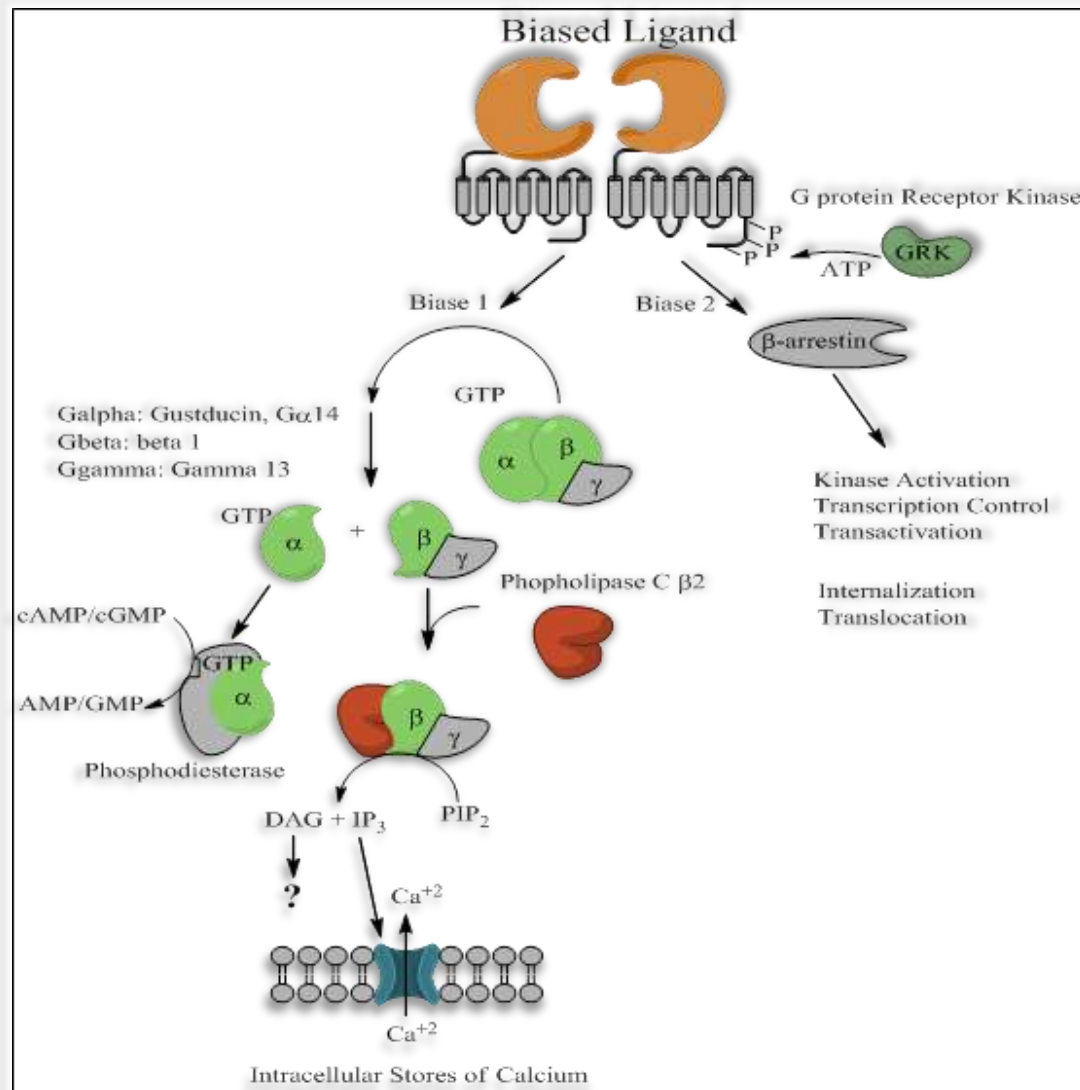


Brain Images
using fMRI

BEHAVIORAL and Sensory Science?



RECEPTOR BIOLOGY and Sensory Science?

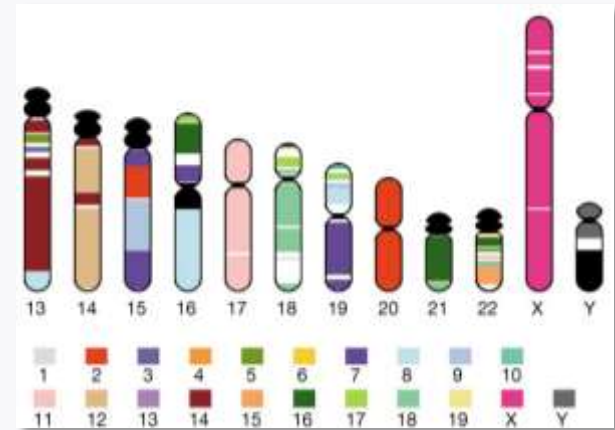
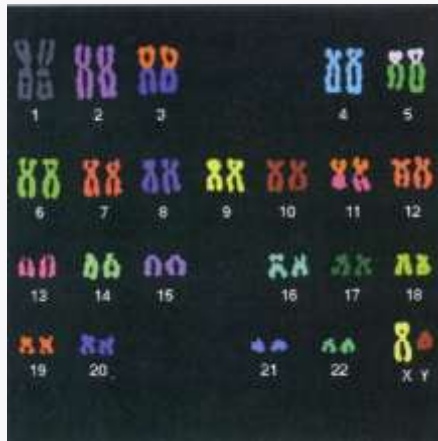


GENOMICS and Sensory Science?

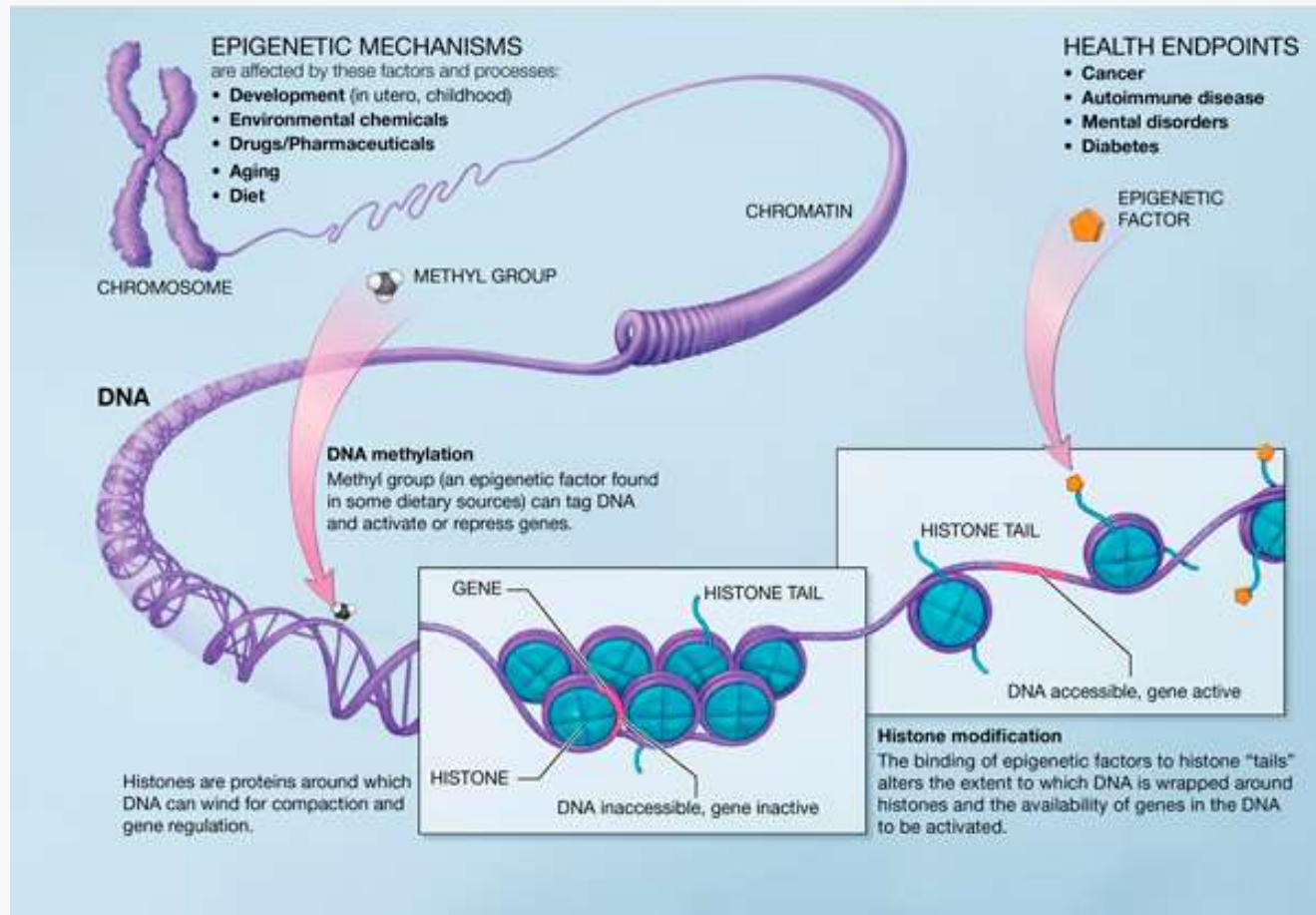


The New England
Journal of Medicine

Over the past 5 years, genomewide association studies have yielded a wealth of insight into genes and chromosomal loci that contribute to susceptibility to disease.

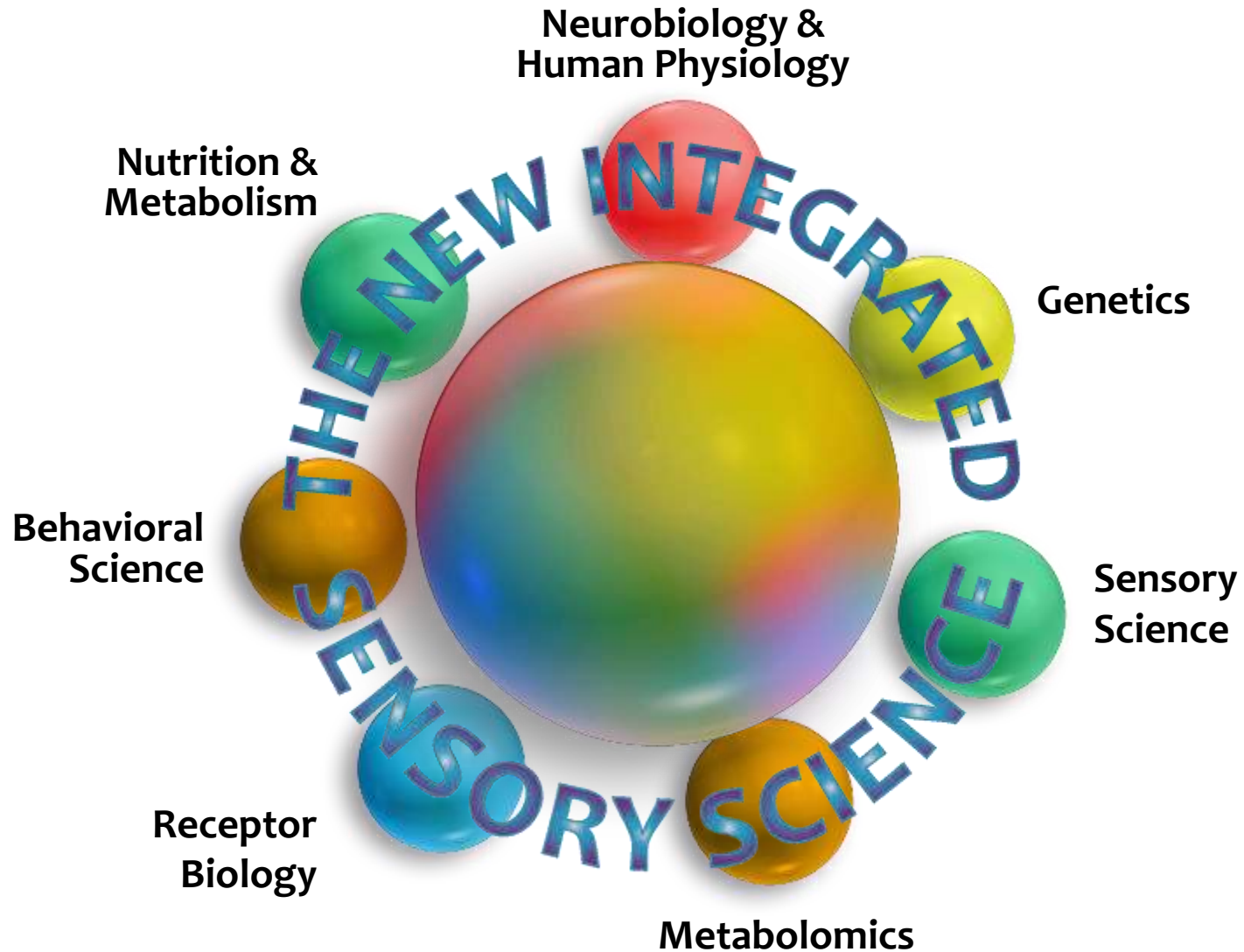


EPIGENETICS and Sensory Science?



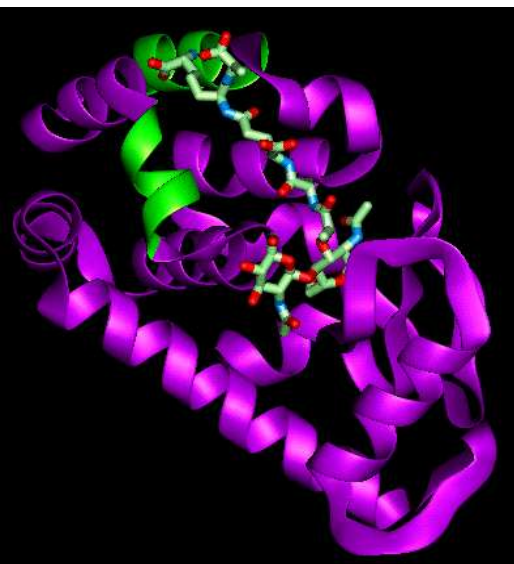
... the study of heritable changes in gene expression or cellular phenotype caused by mechanisms other than changes in the underlying DNA sequence

A NEW Definition of Sensory Science...



A NEW Definition of Sensory Science...





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