



Insertion of Nutrigenetics & Nutrigenomics into CP, DI, DPD Curriculums

March 7, 2019

Disclosures

Silverberry Genomix is the sponsor of this presentation.



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Ask your GenesTM

Objectives

- Understand Nutrigenetics vs. Nutrigenomics
- Identify current clinical applications
- Identify key components needed in CP, DI, and DPD Nutrigenomics focused coursework
- Identify future career applications for students



About Me

Bachelor of Science, Nutritional Science - Pepperdine University

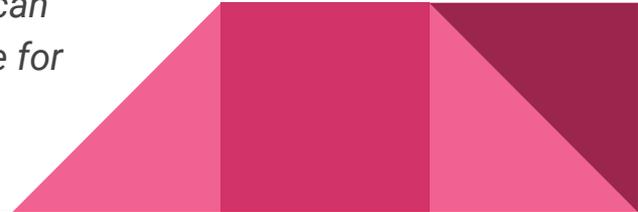
Dietetic Internship - Vanderbilt University Medical Center

Genetics & Genomics Certificate (in progress): Stanford University

Registered Dietitian Nutritionist

Certified Dietitian, Washington State

Academy of Nutrition and Dietetics, Washington State Academy of Nutrition and Dietetics, International Society of Nutrigenetics and Nutrigenomics, American Society of Human Genetics, European Society of Human Genetics, Institute for Functional Medicine

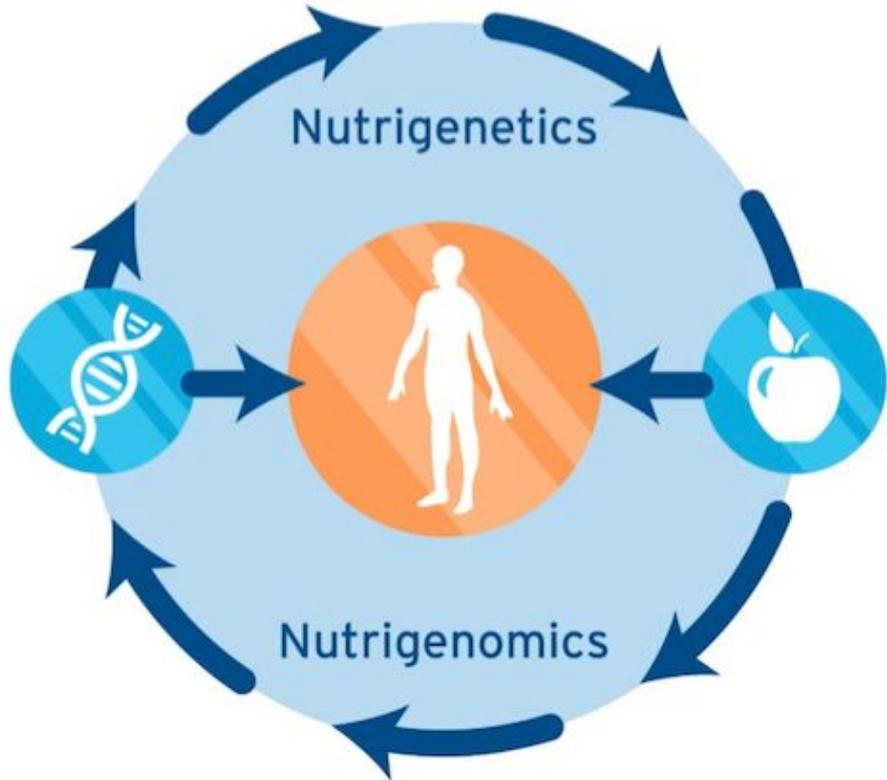


Personal Memory Recall

Can you recall an activity or skill from your youth or adolescence that came very easily to you?



Nutrigenetics vs. Nutrigenomics



Nutrigenetics interactions of our inherited genome with nutrition and environment. How genes influence our biochemistry related to nutrition and disease risk.

Ex: Nutrigenetic Testing Results

Nutrigenomics describes a much broader scope. Including nutrigenetics, it is the study of how nutrients influence gene expression. Epigenetics.

Ex: RDN dietary & lifestyle recommendations based on genetic testing results

Nutrigenetics

Genetic Testing Options, Interpretation by RDN's

Genetic Testing - Things to Consider

- **What is the analytical validity of the test?** Is the lab CLIA validated? CAP Accredited?
- **Does the test have clinical validity?** Is there adequate scientific evidence for an outcome and the variant(s)?
- **Does the test have clinical utility?** Can clients take action in response to the result(s)?
- **Who is interpreting the test results?** Does the provider have adequate training and understanding of the results and recommendations?

This is where YOU come in! 

Single Gene Approach - Out of Date!

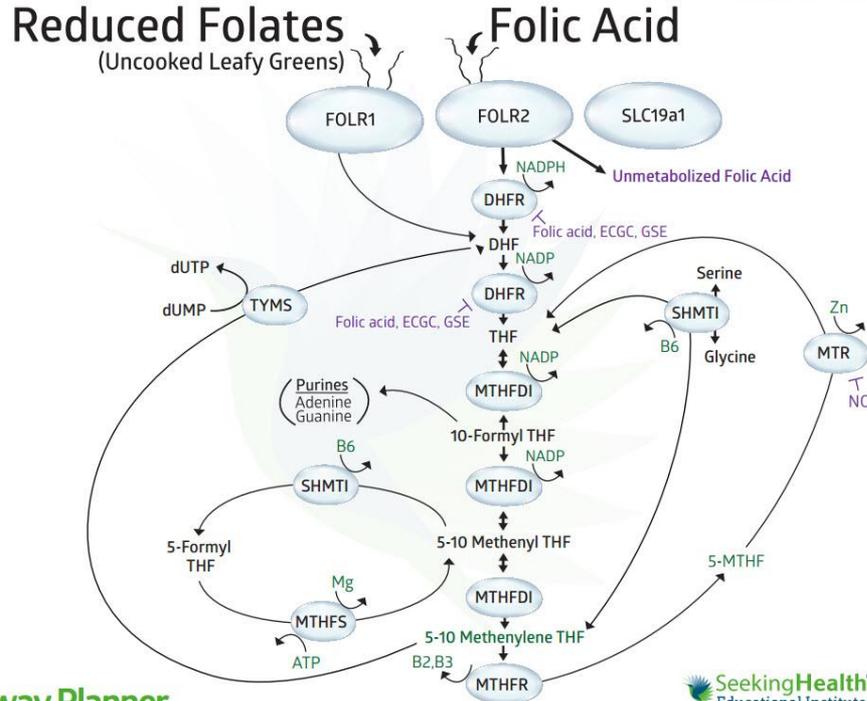
- Single Nucleotide Polymorphisms (SNPs)
 - Ex: ACE, MTHFR

- A few SNPs that works for...
 - Ex: MCM6 for Lactose Intolerance



Polygenic Approach

SeekingHealth.org

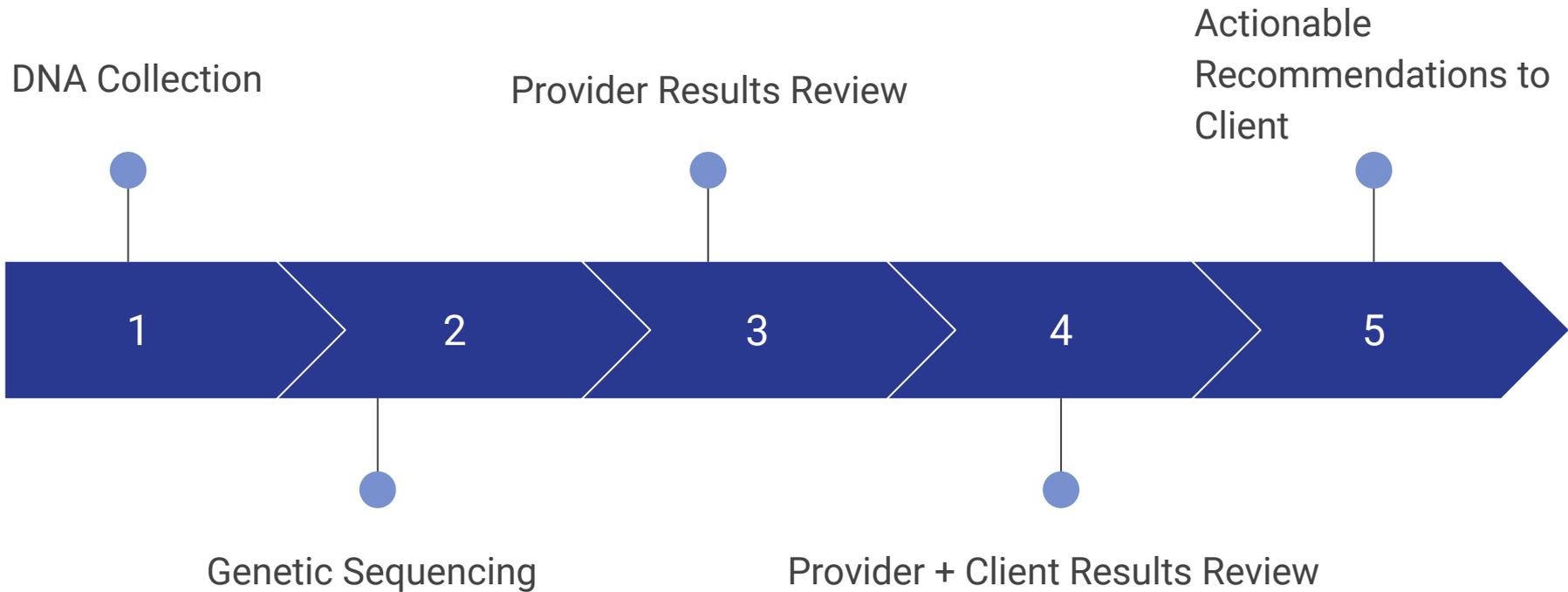


Folate
Pathway Planner

SeekingHealth®
Educational Institute

Important to move towards
Polygenic Approach

- Ex: MTHFR Cascade





Proposed Course Example

“Nutritional Genomics”

This course focuses on the fundamentals of Nutrigenetics (*how genes influence our biochemistry related to nutrition and disease risk*) and Nutrigenomics (*the study of how nutrients influence gene expression*) and how to use these concepts in clinical application in the desired field of study.



End Game

Upon completion of this course, students should be able to:

- Participate in intelligent and informed discussions surrounding current events within the field of nutrigenetics and nutrigenomics.
 - Demonstrate critical thinking skills surrounding genetic testing including evaluating genetic testing companies, new technologies, and interpreting new studies arriving in the field.
 - Review a genetic report and translate results data to a client for specific nutritional and lifestyle recommendations for useable clinical application
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Teaching Techniques for “Nutritional Genomics”

- **Interactive Lecturing**

- Personal Memory Recall: Can you think of an activity from your childhood or adolescence that you felt “naturally” very drawn to or gifted at? (Reading, Drawing, Athletics, Music, etc)
- Informational Recall: How much do you know about DNA? Write down everything you know about DNA on your paper in the next 60 seconds.



Teaching Techniques for “Nutritional Genomics”

- **Inverted Classroom**

- Assigning videos outside the classroom (interviews with geneticists, TED Talks about Artificial Intelligence, etc) to be quickly quizzed on at the beginning of class and then discussed and dissected in class





Ladies and gentlemen,

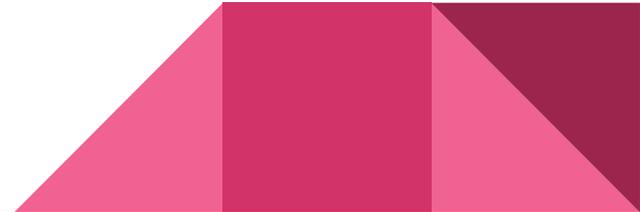
Teaching Techniques for “Nutritional Genomics”

- **Cooperative Learning**

- Small group discussions, developing questions in teams, defining/summarizing material taught in class in teams, etc

- **Guided Note Taking**

- Moderate guiding, creating a structure for overall class notes and study guides



Proposed Course Schedule

Intro to Course

Class One

Overview of Expectations

*Personal Gene Sequencing

Grading

Tests/Quizzes

Inverted Classroom Videos

Final Project

*Personal Gene Sequencing

Optional for students to use their own DNA data throughout the course

Saliva DNA collection

Sponsorship donation of kits from nutrigenetic company

Work cost of kit/sequencing into course cost

In lieu of textbook, have students pay for DNA Kit

Opt out: use anonymous example genetic data

Genetics Review

Class Two

Genetics Glossary: Understanding the proper language and use of language within genetics

Nutrigenetics vs. Nutrigenomics

Class Three

Key differences

Examples of Nutrigenetic Testing
and Biochemistry

Examples of Nutrigenomics and
Biochemistry

Testing Technologies

Class Four

Array Technologies

Genotyping

Next Generation Sequencing (NGS)

Whole Exome Sequencing

Whole Genome Sequencing

Review of Current Companies

Privacy & Security

Class Five

HIPAA

GINA

How to store genetic data

Learning about your genetics shows
you about others

Polygenic Examples

Class Six

Cardiometabolic

Vitamin & Mineral Metabolism

Macronutrient Structure

Weight Management

Anxiety & Depression

Final Projects

Class Seven +

10-20 min Final Presentation:

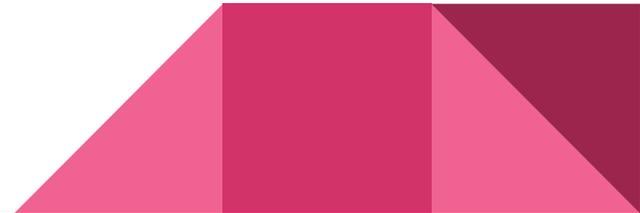
Nutrigenetic Analysis

Nutrigenomic Recommendations

Personal or Anonymous Data

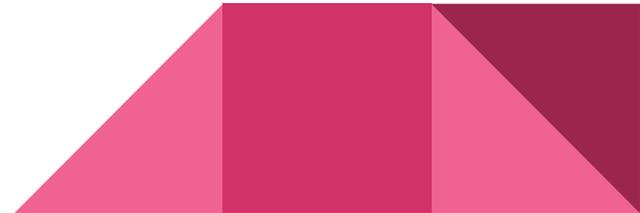
Extra Material for Overtime

- Ancestry
- Metabolomics
- Proteomics
- Microbiome
- Pharmacogenomics
- Medical and Disease Risk Genetics



Required Reading & Textbooks

- There should be no required textbook, but relevant scholarly articles, research papers and other media formats (podcasts, interviews) will be provided throughout the class for review.



Career Applications

- Registered Dietitian Nutritionists
 - Weight Management
 - Sports Nutrition
 - Cardiometabolic Disorders
 - Functional Medicine & Nutrition
 - Gastrointestinal & Gut Health
 - Medical Professionals
 - Use in preventative healthcare
 - Understanding of this option to explore further with patients and other allied health professionals
 - Research & PhDs
 - Need LOTS more research within Nutrigenetics specifically
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Summary

- 1) Get on the train!

 - 2) Design a Course or Unit
 - a) Include Nutrigenetics & Nutrigenomics
 - b) Go over current biotechnology
 - c) Include actual nutrigenetic analysis and nutrigenomic recommendations
 - d) No textbook
 - e) Inverted Classroom
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Thank you!

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