Epigenetics and Constitution

With Steven Horne, RH(AHG)

Genetic Myths and Legends

- Scientists once thought that factors like intelligence, talent and good health were determined by genetics
- Science fiction writers wrote about genetically-enhanced humans with increased intelligence, health and strength
- Turns out genetics doesn’t work that way

Understanding Genes

- Genes are blueprints for the creation of proteins, the building blocks of cellular structure and processes
- The body uses DNA to create RNA
- RNA then creates sequences of amino acids that become proteins

DNA

- DNA consists of strings of Deoxyribose (a sugar) attached to a Nucleic Acid
- There are only four types:
  - Adenine (A)
  - Cytosine (C)
  - Guanine (G)
  - Thymine (T)
- Each can only bond to one other type:
  - A-T
  - T-A
  - C-G
  - G-C

DNA Replication

- DNA can be replicated because if you separate the two strands, each nucleic acid can only match with one other
- Enzyme systems prevent mismatches so that an exact copy is created

RNA

- RNA is similar to DNA but uses a base of the sugar ribose to attach the nucleic acids
- The nucleic acid thymine is replaced with uricile (u)
- DNA is used to create RNA which is then transported to ribosomes where it is used to create proteins

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RNA and Amino Acids

• Each sequence of three nucleic acids codes for a different amino acid
  – UUU, UUC = phenylalanine
  – AUG = Methionine
  – GUU, GUC, GUA, GUG = Valine
  – UCU, UCC, UCA, UCG = Serine
  – UAU, UAC = Tyrosine

Reading the Genes

• Each “link” of an RNA chain is coded to attach a specific amino acid to a polypeptide chain
• This takes place in ribosomes within the cell

Protein Structure

• The chain of amino acids created from the RNA collapses into a three dimensional shape
• This creates the protein that becomes part of the cells structure and function
• As electrical charges are changed, the protein shape can be altered
• Proteins called enzymes can also alter other chemicals

Genes and Proteins

• Before the human genome project, scientists estimated there were about 120,000 genes, one for each protein in the human body
• Instead, they found there were only about 25,000 genes
• Plus, 98% of the genes don’t code for proteins

Introducing Epigenetics

• The material that is above the genes is called the epigenome
• The epigenome is larger than the genes themselves
• Epigenetic markers can turn genes on or off, or up-regulate or down-regulate them
• The epigenome controls how genes are utilized by the cell
**Cell Differentiation**

- Every cell of the body contains the genetic material for the whole body
- Cells in different tissues use different portions of the genetic code that give them their specialized functions
- This is regulated by epigenetics

**Environment Determines How Genes Manifest**

- The "brain" of the cell is the cell membrane
- The cell membrane reads the environment, then utilizes the genes to make the proteins required to deal with that environment
- Epigenetic research suggests that diet, lifestyle and even our thoughts and feelings influence genetic expression

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"When I provided a healthy environment for my cells they thrived; when the environment was less than optimal, the cells faltered. When I adjusted the environment, these “sick” cells revitalized."

“But most cell biologists knew nothing of this wisdom of tissue culture techniques. And scientists moved sharply away from considering environmental influences after discovering DNA’s genetic code.”

—Bruce H. Lipton, Ph.D. in The Biology of Belief

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**A Model of Disease and Cure**

“When a gene product is needed, a signal from the environment… activates that gene”

—H. F. Nijhout in Metaphors and the Role of Genes and Development

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**Nature or Nurture**

- Are our personality traits, abilities and physical attributes:
  - Nature (genetic)
  - Nurture (environmental influences)
- Turns out it’s a combination of both
- We can modify gene expression for better or for worse AND pass these modifications onto future generations
Epigenetic Regulators

- Diet and Nutrition
- Lifestyle
  - Exercise
  - Education and Training
  - Choice of Activities
- Chemicals
- Mental Attitude
- Emotional State
- Beliefs

Environmental Triggers

- Environmental influences can trigger epigenetic changes that cause “inherited” diseases to manifest
- These triggers can include:
  - Traumatic life events
  - Nutritional deficiencies
  - Exposure to toxins
  - Poor health habits

Example One: Cancer

- Certain genes keep cells from becoming cancerous
- Histones can turn these genes off causing the cell to mutate and become cancerous
- Foods like broccoli and other cruciferous vegetables, garlic, and onions contain substances that act as histone inhibitors
- This helps keep these cancer-blocking genes active

Example Two: Mental Health

- Abuse and trauma appear to create epigenetic changes in brain cells
- For instance, they may affect DNA methylation patterns, which can cause over- or under-methylation in cells
- These epigenetic changes can alter brain chemistry, causing mental illnesses like depression or schizophrenia
- They can also create general poor health, something that often happens to adults who experienced abuse as children

Rat Study

- Rats who received a great deal of physical attention (licking and cuddling) as babies produced more receptors for cortisol in the brain
- This means that the feedback loops in the stress response act faster to shut off the production of stress hormones, helping the rodents to feel calmer in stressful situation
- Rats who did not receive this attention produced less cortisol receptors, which caused them to suffer from higher levels of anxiety as adult mice

Nutrition and Epigenetics

- Methylation is used to deactivate genes
- For instance, epigenetic changes can cause some people to over-methylate and others to under-methylate
- They may also cause the body to have difficulty processing individual nutrients
- This is why no diet or supplement works for everyone
Epigenetic Experiment

- Two groups of pregnant mice with the agouti gene that produces yellow fur and a tendency for obesity and diabetes mice yellow coats.
- One received a diet rich in B vitamins (folic acid and vitamin B12).
- The other group of genetically identical pregnant mice got no extra prenatal nutrition.
- B vitamins acted as methyl donors: they caused methyl groups to attach more frequently to the agouti gene in utero, thereby altering its expression.
- B-vitamin group produced healthy brown mice of normal weight with no propensity to diabetes.

http://www.time.com/time/health/article/0,8599,1951968-2,00.html

Methylation Symptoms

<table>
<thead>
<tr>
<th>Overmethylation</th>
<th>Undermethylation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obsessive thoughts without compulsive actions</td>
<td>Obsessive-compulsive; ritualistic behaviors</td>
</tr>
<tr>
<td>Hairy body (hirsutism)</td>
<td>Sparse body hair</td>
</tr>
<tr>
<td>Low libido</td>
<td>High libido</td>
</tr>
<tr>
<td>Low motivation in school</td>
<td>Strong willed</td>
</tr>
<tr>
<td>Non-competitive</td>
<td>Competitive in games and sports</td>
</tr>
<tr>
<td>Talkative; high artistic ability</td>
<td>Perfectionistic</td>
</tr>
<tr>
<td>No seasonal allergies; antihistamine intolerance</td>
<td>Seasonal allergies</td>
</tr>
<tr>
<td>High anxiety</td>
<td>Phobias</td>
</tr>
<tr>
<td>Food and chemical sensitivity</td>
<td>Addictive tendencies</td>
</tr>
<tr>
<td>Adverse reactions to SAMe, SSRI antidepressants</td>
<td>High fluid production (saliva, tears)</td>
</tr>
</tbody>
</table>

Methylation Correction

<table>
<thead>
<tr>
<th>Overmethylation</th>
<th>Undermethylation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respond to folate supplements</td>
<td>Respond well to methyl donors like Sam-e</td>
</tr>
<tr>
<td>Do not respond well to methyl donors like Sam-e</td>
<td>Respond poorly to folic acid or folate supplements</td>
</tr>
<tr>
<td>Sam-e is a natural reuptake inhibitor for serotonin, dopamine and norepinephrine</td>
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</tr>
</tbody>
</table>

Prenatal Nutrition

- Epigenetics suggest that parents who want healthy children should "clean up their act" before conception.
- It also demonstrates the importance of good prenatal nutrition.
- Folate or folic acid, for instance, has been shown to reduce birth defects.
- Pregnant women should eat healthy and take supplements to ensure adequate nutrition.

Prenatal Nutrition Quotes

- 1980’s Dr. Lars Olov Bygren proved in Stockholm that: "conditions in the womb can affect your health, not only when you were a fetus, but well into adulthood.”
- 1986 Lancet Journal showed “if a pregnant woman ate poorly, her child is at higher risk for CV disease as an adult.”

Smoking May Affect Epigenetics

- A study of 166 fathers who smoked before age 11, showed that smoking may cause epigenetic changes.
- Their sons had higher rates of obesity and heart disease and shorter lifespans.
- This suggests that harmful epigenetic changes from smoking may be passed onto offspring. (European Journal of Human Genetics 2006)
Genetically Modified Soy

- Mice fed GMO soy had changes in testicles suggesting possible problems in sperm cells
- Embryos of mice fed GMO soy had changes in DNA expression, compared to those whose parents were fed natural soy
- 56% of rats whose mothers were fed GM soy died within 3 weeks compared to 9% of those whose mothers ate non-GMO soy
- After the study was completed, the rat food used by that laboratory began incorporating GMO soy. Within 2 months infant mortality skyrocketed to above 50%
- This is the same GM soy that’s planted in 89% of the soy fields in the U.S.

Jeffrey Smith - leading spokesperson on the health dangers of genetically modified organisms (GMOs) 2003 Seeds of Deception.

GMOs and Humans

- The only human feeding study ever published showed that genes inserted into soybeans to make them herbicide tolerant transferred into the DNA of human gut bacteria and became a stable part of their DNA.
- This means that long after you stop eating a GMO food, your own gut bacteria may be producing these foreign proteins, including the possibility of producing the Bt toxin – a pesticide.
- This means that eating a GMO corn chip could theoretically turn your intestinal flora into living pesticide factories, possibly for the long-term.
- In general, the FDA allowed the products anyway without adequate testing because it was declared that it was “generally recognized as safe.”

Avon Longitudinal Study of Parents and Children (ALSPAC)

- Baby lotions containing peanut oil may be partly responsible for the rise in peanut allergies
- High maternal anxiety during pregnancy is associated with the child’s later development of asthma
- Little kids who are kept too clean are at higher risk for eczema

Thoughts and Feelings

- A researcher epigenetics, Konstantin Eriksen, recently stated:
- “Contrary to what many people are being led to believe... we are free to make decisions that impact our lives and those of others. Our beliefs can change our biology. We have the power to heal ourselves, increase our feelings of self-worth, and improve our emotional state.”
- (http://wakeup-world.com/2012/03/26/the-science-of-epigenetics-how-our-minds-can-reprogram-our-genes)

Love Your Genes

- Good nutrition
  - Vitamins, especially B-complex
  - Antioxidants
  - Probiotics to create healthy gut flora
  - Adaptogens
- Avoid toxins (drugs, smoking, alcohol and chemicals)
- Exercise the body and mind
- Learn to cope with stress
- Cultivate positive attitudes and let go of past emotional trauma

Constitution

- All traditional systems of medicine incorporate the idea of constitutional types
- A constitutional type may include:
  - Basic body structure
  - Tendencies to physical strengths and weaknesses
  - Basic personality tendencies
- Traditional constitutional types are often linked to basic energetic models
  - 4 elements (air, water, fire, earth)
  - 5 elements (wood, fire, earth, metal, water)
Is Iridology an Epigenetic Window?

Constitutional Iridology

- Iridology suggests that certain iris structures are indications for both:
  - Physical strengths and weaknesses (tendencies to certain health problems)
  - Basic personality tendencies (both strengths and weaknesses)
- Whether the physical health issues associated with these iris structures manifest appears to be largely dependent on diet and lifestyle choices
- The personality tendencies tend to manifest as either positive or negative personality traits depending again on a person’s choices
- Iris patterns may become more or less dominant in succeeding generations depending again on choices

Example: Heart Sign

Kidney Zone

What My Eyes Say About Me

Constitution and Environment Interact to Create our State of Health
Questions to Ponder

• What about the 98% of our genetic material that isn’t coding for proteins?
• Under the right conditions could some of this be triggered into activity?
• How much control does thought or consciousness have over genetics?

Do We Possess Genetic Memory?

Can we influence plant genetics? *Brassica oleracea* varieties

There’s a Lot We Don’t Know

Upcoming Classes

• *Personality Typing and Relationships*: $97, $77 for members, price increases to $197 after Jan 11, (starts Thursday, January 11)
• *Nature’s Pharmacy*: $247, $197 for members, $47 refresher course from previous Nature’s Pharmacy class, (starts January 7)
• Visit [www.modernherbalmedicine.com](http://www.modernherbalmedicine.com) or call 800-416-2887 for information and registration.

Any Questions?

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