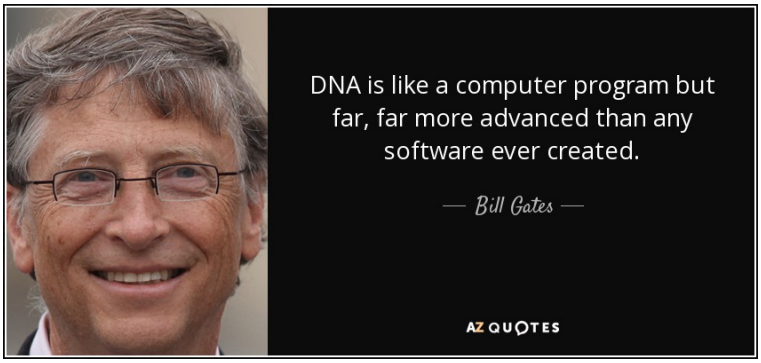
1

What are Genes?

- **Genes are our blueprint for life**
- A gene is a distinct stretch of DNA which is your inherited genetic material that determines something about who you are
- Genes manage the orchestra of life by making proteins
- Proteins are the fabric of our body
- Each gene is essentially a recipe for a making a certain protein
- Proteins build, regulate and maintain the human body
- Examples of how proteins work: become bone, muscle, a hormone

2

DNA: Software for Life



3

Code for Computers versus Code for DNA

Computer Code

- **0,1 (**Binary system)
- 01010101 = B**yte**
- Unit **digital** information, consisting of eight binary digits
- Encodes a single character of text in a computer

4

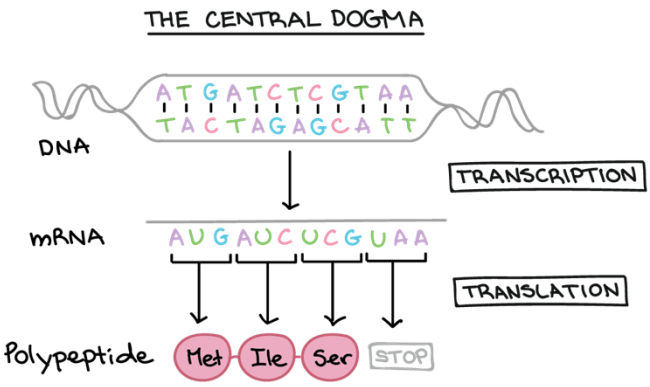
DNA Code

DNA Code

- ATCG (Digital System)
  - Adenine: Thymine
  - Cytosine: Guanine

- Codon = DNA “byte”
  - Three 3 possible nucleotides (GCC = amino acid, alanine) in nucleus
  - Stringing together codons can produce a chain of amino acids = protein

5



Genes translate information from DNA into a protein

Image source: Kahn Academy

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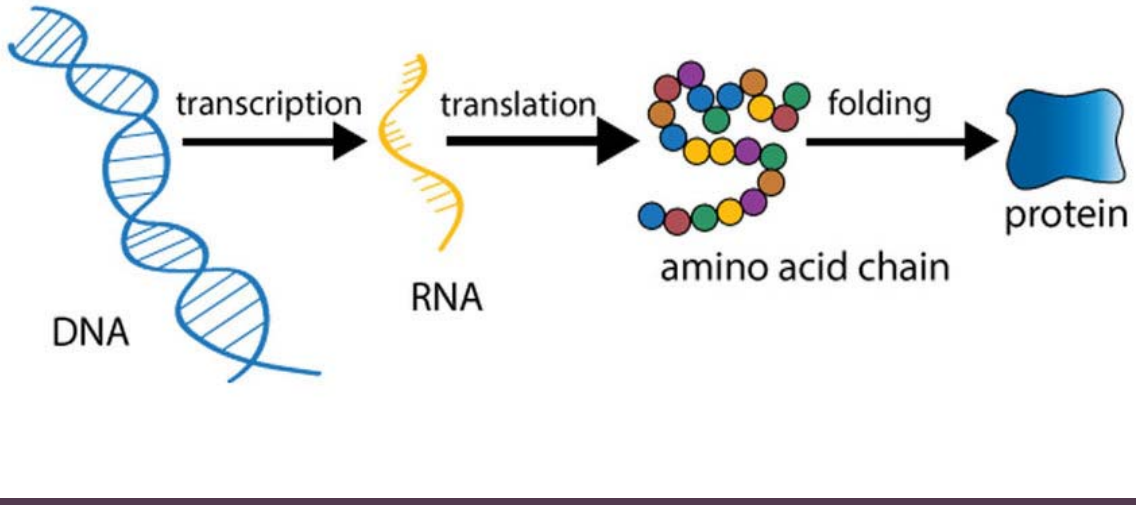

7

How genes make us different

- We basically all have the same genes: 99% identical
- But genes have a little bit of flexibility (plasticity)
- When our cells replicate, there are many opportunities for basic gene errors which are called SNPs (Single Nucleotide Polymorphisms)
- When genes transcribe for proteins, sometimes an error occurs which changes the basic recipe for a protein
- What differentiates us, one from another, are these SNPs
- **SNP's are not life threatening. One SNP will not change your life, or cause disease**
- **In other words, SNPs are normal!**

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Gene Mutations versus a Gene SNP

Mutations occur in less than 1 % of the population and are RARE

They cannot be modified by food or lifestyle intervention

They result in life-threatening conditions

Gene SNPs

Occur in most of the population

One SNP is not life-threatening

A series of SNPs in one pathway can subtly impact health

SNPs can be modified by diet and lifestyle

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How we use gene information to support your health

- In genomic medicine, we look at the **collective number of SNPs in a biochemical pathway** and assess the impact of the TOTAL number of SNPs on physiological processes in your body
- We use laboratory information to determine the impact of the SNPS (or errors) on how your body is functioning.
- We can use **food** and/or supplementation to influence the behavior of the gene. Or we can create a work around. We measure our work by repeating the laboratory work and looking for change or response
- We can also use modifications such as stress management and exercise to help you help your genes
- This is the power of personalized medicine

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Do you need a genomic test?

- Genomic tests provided the most personalized insights into how genes work in YOUR body
- They are a powerful tool if you have an active health condition that you are having difficulty managing
- They are a powerful tool if you want to optimize your health and are ready for that step
- BUT: we also know a lot about how food works with important genes in the body and you can use the information from this course to create a beautiful food-gene relationship without a genomic test!

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THE GENOMIC KITCHEN

Next Session

- Why your genes matter
- How food informs how your genes behave

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