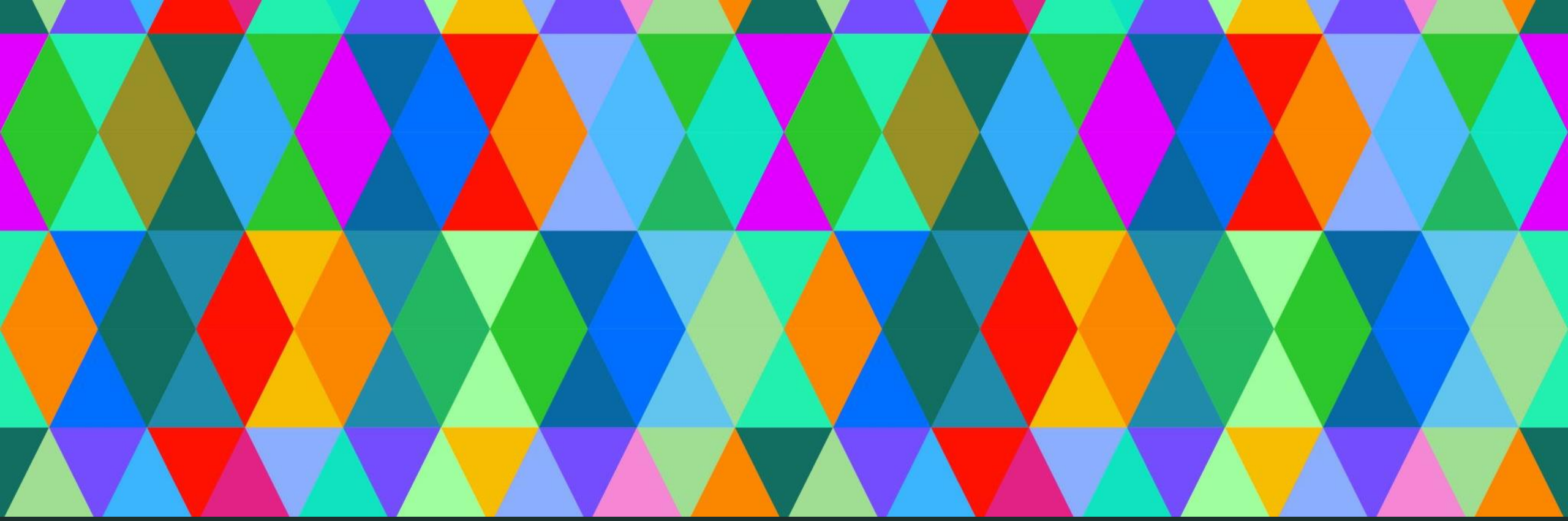

WHAT'S THE DEAL WITH DNA?

Forensic Science

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INTRODUCTION

- What makes your eyes green or your hair curly can pinpoint you as the perpetrator of the crime
- DNA determines much of who you are (even when you are predisposed to commit a crime, according to some), and it's a hot topic in Forensic Circles
- DNA knowledge has been around for a long time
- Chemical makeup of DNA has been around for half a century
- DNA"s use as a forensic tool is just now hitting its stride

OPENING AN INSTRUCTION MANUAL FOR YOUR CELLS

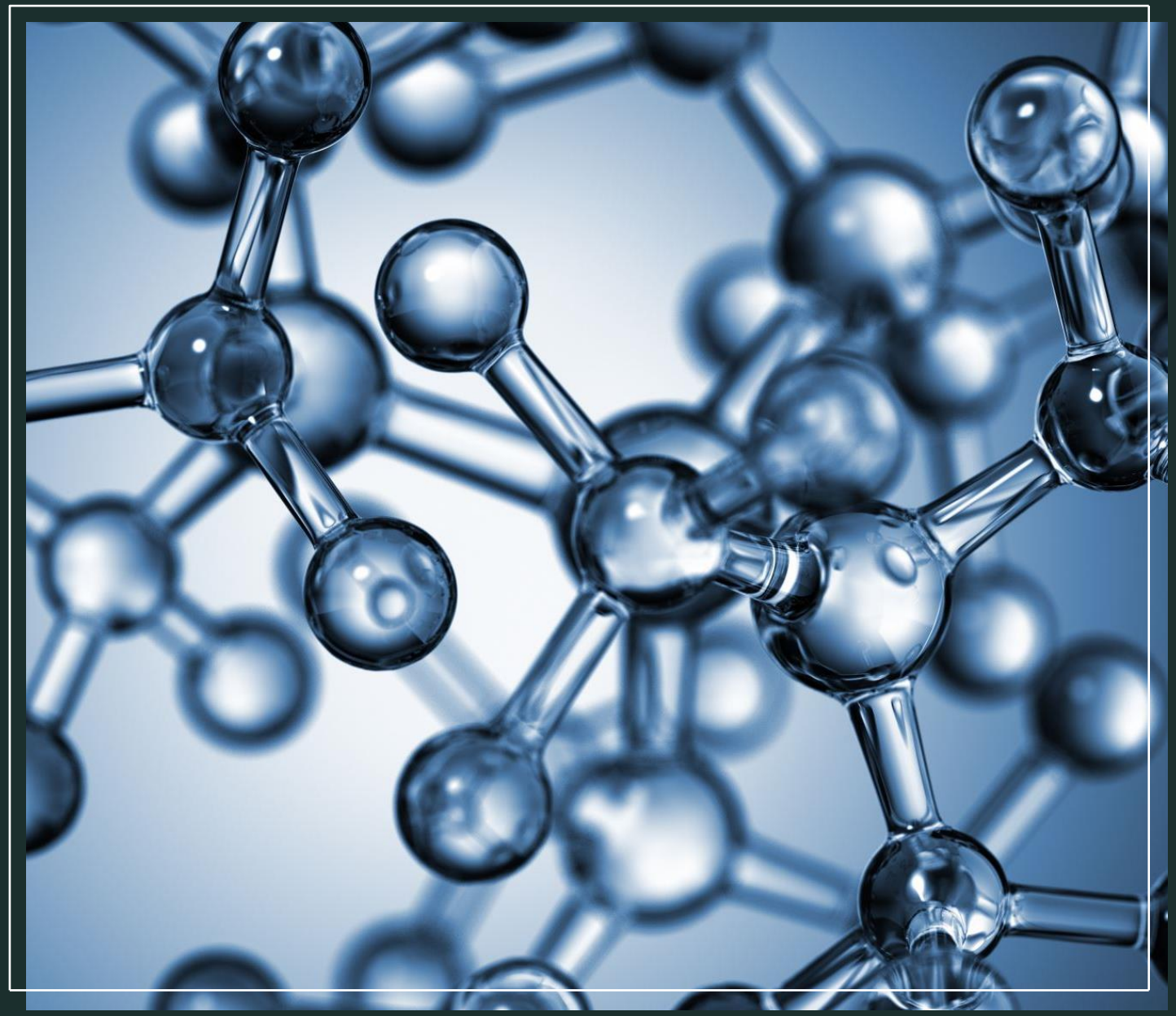
- There are 60 trillion cells in your body
- Certain cells enable you to see, hear, and feel
- Other cells make insulin, sugar and enzymes to digest your food
- Your heart muscle cells pump blood through your lungs where your red blood cells pick up oxygen and deliver this precious cargo to all cells of your body
- DNA is the instruction manual that tells each cell what to do

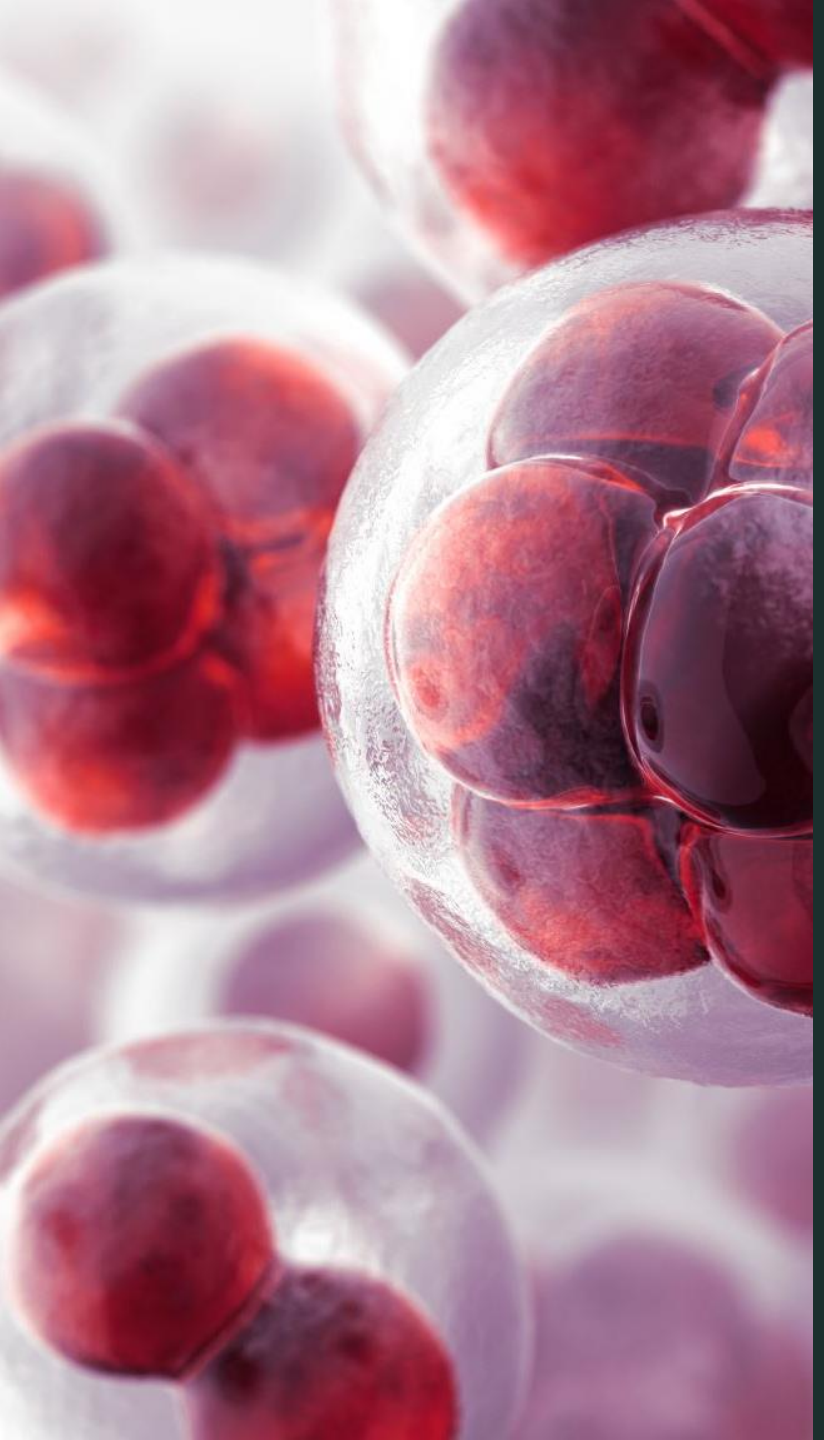
LOOKING AT THE NUTS AND BOLTS OF DNA

- DNA is a complex polymer arranged in a double helix and formed into long strands called Chromosomes
- These chromosomes lie within the nucleus or central core of each cell
- Portions of the chromosomes called genes are the basic unit of heredity
- Along the chromosomes, each gene has its own specific location, which is called a locus

DNA CONTINUED

- When the chromosomes pair off so do the loci
- Your genes pair together too
- Each paired gene is called an allele, and the two together are referred to as an allelic pair





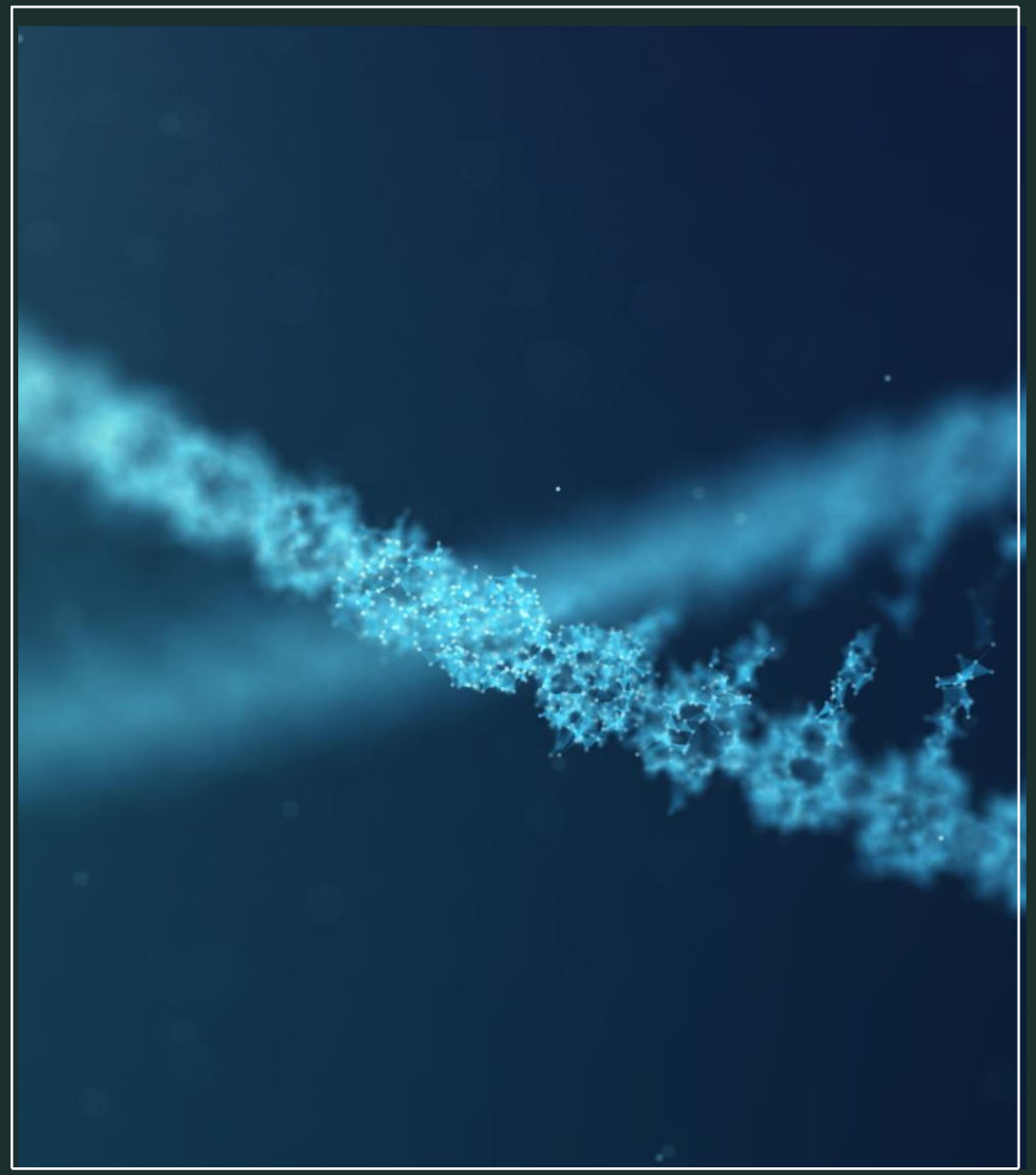
DNA IN HUMANS

- Humans have 46 chromosomes that are arranged in 23 pairs within each cell's nucleus
- The cytoplasm or the fluid portion of the cell surrounds the nucleus which are the rest of the cellular components which is held together by a cellular membrane
- The cell membrane separates each cell from the surrounding environment
- In short, each cell basically is a little packet of life

THE SEQUENCE OF DNA

- DNA is a polymer, or a molecule of smaller units strung together like a train
- The smaller units are called monomers
- Four bases are involved in the production of a DNA Polymer which are referred to as G,C,T, and A (all life is based on this four letter alphabet

  Guanine, Cytosine, Thymine, Adenine



DNA STRANDS

Millions of bases are stringed together in any given DNA strand and they can hook up in any conceivable order

In the same way the ABC's can be ordered to form a message, DNA letters delivery depends on their order

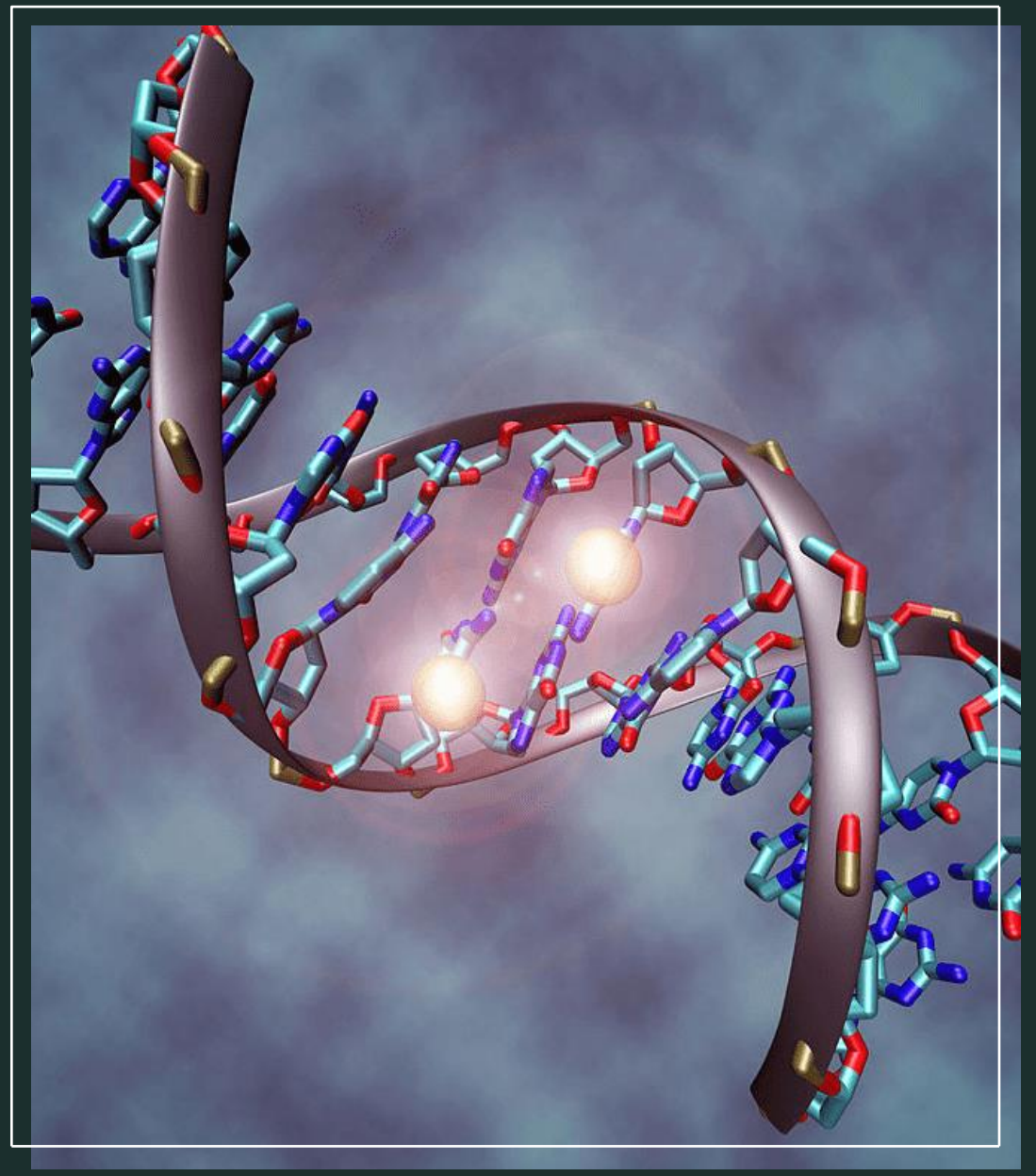
A DNA sequence may be way to provide instructions to manufacture a portion of a protein that is used in the cell wall of a neuron

DOUBLE HELIX AND THE BASE PAIRING RULE

- Human DNA is double stranded, which means that it consists of paired strands of these bases that are wound together into a twisted ladder structure called Double Helix
- When these bases pair off to form a double helix, the bases in each strand are a pairing dictate that C binds only with G (and Vice Versa), and A binds only with T (and Vice Versa)
- The base pairing rule that C bonds only with G and A only with T is critical with DNA replications or reproductions ensuring that all new DNA strands are exact copies of the originals

DNA UNIQUENESS: MINE ALL MINE

- We each have 3 billion base pairs (A-T and G-C pairing within the DNA molecule) in our DNA – 6 Billion Bases in all
- Because these bases can be put together in any order- the possible base sequence for any given DNA strand is astronomical
- That number is the reason that all humans are different and it serves as the basis for DNA typing in the Forensic Lab



REPRODUCTIVE CELLS AND RED BLOOD CELLS

- Reproductive Cells and Red Blood Cells (RBC's) – all the cells in your body have 23 pairs of chromosomes within their reproductive nuclei
- The RBC's don't have nuclei and thus have no chromosomes
- Reproductive Cells- eggs and sperm- on the other hand contain only 23 unpaired chromosomes

EXCEPTIONS TO THE RULE CONTINUED

- These cells pair off with each other during fertilization, giving each new person a total of 46 chromosomes that contain genetic information from the father and mother
- More than 8 trillion possible combinations arise from just two parents
- The mother randomly donates one chromosomes from each of her 23 pairs of chromosomes to each egg she produces
- The same number of possibilities exist in the father. Because sperm can combine with any of the mother's eggs, the possibilities become huge

THANK YOU FOR YOUR TIME AND ATTENTION

Questions and Comments