March 1st 2013 - Ch. 5

DNA, Gene Expression and Biotechnology

What is the code and how is it harnessed?

What is it?

* DNA is a nucleic acid, a macromolecule that stores information.
* It consists of individual units called nuleotides: a sugar, a phosphate grouip and a nitrogen containing base

TWO important feat. Of DNA

1. DNA contain instructions on how to create a body and control its growth and development

2. Instructions are passed

DNA

3 things to know

* Structure
* How it works: DNA to proteins
* How it replicates: When? And Where?

STRUCTURE

* Double Helix Twisted
* Watson and Krik were the first to come up with the shape of DNA
* Roslyn Franklin had the DNA x-rays that Watson & Krik used to discover the shape.
* DNA consists of two polynucleotides twisted in a double helix
* The sequence of the nitrogenous bases in DNA carries genetic information

HOW IT WORKS

* DNA gives instructions for building every organism on earth
* Genome – complete set of DNA . It can be found in the nucleus of virtually every cell.
* Alleles – alternate versions of a gene that code for the same trait
* 95% of your DNA is non-coding DNA.

Take-home message

* Only a small fraction of the DNA in eukaryotic species codes for genes.
* The function of the rest is still a mystery. (Although we are now starting to understand some of the functions of so called “JUNK” DNA)

March 4th 2013

Ch. 7 – Genes and Inheritance (how traits are inherited)

7.1 Family resemblance: Your mother and father contribute equally to your genetic makeup

7.2 Heredity – The passing of characteristics from parent to child.

Traits that are determined by the instructions a person carries at one gene are called single-gene traits.

Are there multiple-gene traits too?

* Yes

Mendel learned about heredity by conducting experiments

* 2 laws of inheritance:

Law of segregation

Law of independent assortment

Phenotype does not determine genotype.

Punnits Square

1. Write the key

2. Determine the parents genotypes

3. Make Gametes

4. draw square fill in gametes

5. Fill in the square

6. Count genotypes

7. Determine Phenotype

8. Answer the question

Plant: Flat / Crinkled

Leaves: F = Flat

F= crinkled

Parents: Flat: Ff Crinkled: ff

Ff Cc

\*\*\*\*\*Possible Genotypes\*\*\*\*\*

* Homozygous dominant
* Heterozygous
* Homozygous recesive

Take home message:

It is not always possible to determin geo from pheono

A recessive can be masked by a dominant

Genetic analysis makes use of clever experiments and Punnett squares.

3-11-13

7.8 Using pedigrees to decipher and predict the inheritance patterns of genes.

Pedigree: a type of family tree

A pedigree is a useful tool to document a trait of interest across multiple generations of family members.

DOING A PEDEGREE CHART:

1. Read and understand the key

- Circles are female

- Squares are male

- Square or circle shaded in means they exhibit the trait.

2. Number the generations and individuals

- Generations are indicated by roman numerals

-individuals are number from left to right

3. Fill in what you know

- fill in the non-exhibitors with heterozygous recessive

- fill in the exhibitors with a upper-case “D”

4. Do the detective work.

3-13-13

7.9 Incomplete Dominance and co-dominance: The effects of both alleles in a genotype can show up in the phenotype.

- Incomplete Dominance, in which the heterozygote appears to be intermediate between the two homozygotes.

- Co-dominance, in which the heterozygote displays characteristics of both homozygotes.

Take-home message 7.9

Effects of both alleles in a heterozyhous genotype are visible.

Incomplete cominance-a heterozygote

7.10 What’s your blood type?

Some genes may have more than two alleles.

Multiple Allelism

A single gene has more than two alleles

Inheritance of the ABO Blood Groups

* A,b, and o alleles
* The “A” and “B” alleles are both completely dominant to “O”.
* The A and b alleles are codominant to each other.

Bring DNA sequence

* TAC ACG GCA CAT AAA CCG ACT