**Study Sheet for Biotechnology (part of Chap 5)**

This list is only a study **guide**, **not** a complete list of all the material on the test. **Any material discussed in class is potential test material.**  Do not forget to go over your class material/power point slides. Please bring questions to office hours or by appointment*.*

**1) Genetic Engineering**

Know the terms:

Recombinant DNA technology

Plasmid

Restriction Enzymes

DNA ligase

Bioengineering ( = genetic engineering)

Transgenic organisms

Genetically modified organisms (GMO)

Crispr: is the relatively new molecular mechanism used to edit DNA. By this we can modify multiple genes at the same time in an animal or plant cell and this is more precise and efficient than the current technology in use.

**Explain the basic procedure of forming recombinant DNA.**

What enzyme is used to cut DNA?

What enzyme is required to glue the fragments back together?

Can recombinant DNA contain DNA from different species?

What are two common vectors (organisms used to transfer recombinant DNA to target cells) used in recombinant DNA work?

Know some examples of genetically modified organisms (that we discussed in class…please refer to class notes and power point slides)

Fears and risks of GM foods (Sec 5.13 chap 5)

**2) DNA Analysis**

Techniques:

1. DNA profiling/DNA fingerprinting

2. Polymerase Chain Reaction (PCR)

3. Gel electrophoresis

4. Genetic markers

Match the following with the analysis techniques mentioned (above)

A. -Allows researchers or counselors to identify harmful alleles (forms of genes) in the genetic material of an individual. Uses: Diagnostic or predictive information

B. Used to separate DNA fragments according to size.

C. Used to “amplify” (make more) the quantity of DNA

D. Used to compare DNA samples to each other to determine relatedness.

Forensics, paternity suits, animal tracking studies, classification studies.

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How is DNA profiling done?

What is being compared when profiles are observed?

How do differences in DNA sequence result in different DNA profiles being formed?

(Answer: differences in DNA sequence (in the Short Tandem Repeat (STR) areas) result in different DNA fragment lengths and those fragments move differently in a gel and that results in different band patterns on the gel)

What is PCR? Why is it so commonly used these days? What is the enzyme used in PCR? Know the specific property of the enzyme that is used in PCR.

What are STR?

**3) Personalized medicine**

**What is gene therapy?**

**OMICS: means mass of measurements.**

Gen**omics** refer to data about \_\_\_\_\_

Transcript**omics** refer to data about \_\_\_\_

Prote**omics** refers to data about \_\_\_\_\_

Metabol**omics** refers to data about \_\_\_\_

Microbiomes refers to the different microbes (bacteria, viruses) that live in and on you

What is epigenetics? (Ans: One’s experiences and behavior can influence gene expression. In other words your grandmother’s experiences can be inherited through DNA changes!!!)

What is Personal Omics Profiling? (Ans: Integrating all the OMICS field to develop personalized medicine)