**Biotechnology Practice Test**

**(November 5, 2013)**

**DNA Fingerprinting Lab**

* **Word/Phrase Bank (Use these words/phrases to answer questions 1-9 below)**

**Restriction enzymes, Gel electrophoresis, Longer, shorter, dark blue stain, negative, Loading dye, is attracted toward the positive pole (also, it is repelled from the negative pole), A pipette.**

1. What electrical charge does DNA have? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. The procedure that is used to separate DNA fragments is called \_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. These molecules are used as “chemical scissors” to cut DNA at specific sites.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. During the process of gel electrophoresis, the fragments of DNA that travel the

greatest distance through the gel are the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ones.

1. During the process of gel electrophoresis, the fragments of DNA that travel the

shortest distance through the gel are the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ones.

1. DNA fragments are pushed through the gel because DNA’s negative electrical

charge \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. This gives the DNA some “weight” so it will stay in the well. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. This instrument allows you to inject the exact quantity of solution where needed.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Added to the DNA, it gives the DNA some “color”, so you can see the bands of

fragments. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. **Eco *R1***is a restriction enzyme that “recognizes” the base sequence **GAATTC**. In

the strand below, show exactly where the strand will be cut by **Eco *R1***.

**G A T T T C G A A T T C C C T T G A A G A A T T C C T T C G A A T T C**

**C T A A A G C T T A A G G G A A C T T C T T A A G G A A G C T T A A G**

How many pieces (fragments) would result? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. There is a crime-scene at a house where a murder occurred. DNA has been left behind. If the DNA matches up with a suspect’s DNA, does that prove he was

the murderer? \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Explain** (don’t be vague): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

12. Does DNA fingerprinting have anything to do with actual fingerprints? \_\_\_\_\_\_\_\_\_\_

13. Looking at this gel, who do you think was present at the crime scene: S1, S2, S3,

or S4? \_\_\_\_\_\_\_

**Crime**

**scene**

**S1**

**S2**

**S3**

**S4**

13. Looking at this gel, which fragment is the shortest “**A**” or “**B**”? \_\_\_\_\_\_\_\_\_

**S1**

**A**

**Crime**

**scene**

**S2**

**B**

**S3**

**S4**

14. What is the difference between selective breeding and genetic engineering?

15. Why do smaller fragments of DNA move faster through the gel and larger pieces move

slower?

**Bacterial Transformation Lab**

16. Sequence the following 4 steps as they relate to the protocol in our Bacterial Transformation Lab (1 is the first step, 2 is the second, and so on).

\_\_\_\_\_\_\_ The host cell (bacterium) sucks in the plasmid.

\_\_\_\_\_\_\_ Through asexual reproduction, the host cell (bacterium) mass produces clonal bacteria that will also express the two transgenic genes.

\_\_\_\_\_\_\_ A gene for florescence and antibiotic resistance is inserted onto a plasmid.

\_\_\_\_\_\_\_ The plasmid becomes part of the bacterium’s chromosome.

* **Word/Phrase Bank (Use these words/phrases to answer questions 17-28 below)**

**Genetic engineering, vector, a sticky end, plasmid, recombinant DNA, antibiotics, clones, Ampicillin, Heat shock, Luria Broth (LB), E-Coli, transgenic organism.**

17. Organisms that have identical copies of DNA are called: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

18. If we inserted **rabbit** DNA into a **bacterium,** wecould call the bacterium a

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

19. When restriction enzymes cut DNA, they leave an “overhanging” end. What is that end called?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

20. A general name of chemicals that kill bacteria: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

21. The antibiotic we used in our bacterium transformation lab was called:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

22. Direct manipulation of genes to achieve desired traits: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

23. A small circular piece of DNA, common in bacteria, that genetic engineers use as a

vector. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

24. A carrier is also known as a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

25. The name of the bacteria that we used, that is also found in our gut: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

26. DNA that has been altered (“recombined”): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

27. A nutritionally rich medium that is primarily used for the growth of bacteria:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

28. This process helps open up the bacteria’s membrane so that the bacteria will “suck-

in” the plasmid. Involves ice and 42**o** C water bath: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

29. What is the difference between fluorescence and bioluminescence?

30. Is there such a thing as a negative (**-**) plasmid? \_\_\_\_\_\_\_\_\_\_ **Explain**. In other words, what do the (-)on the petrie dishes mean?

31. Why was there growth on the LB/AMP **+** plate, but not with LB/AMP **-** plate?

* **Word/Phrase Bank (Use these words/phrases to answer questions 32-45 below)**

**Genotype, Phenotype, Inbreeding, gene therapy, Polymerase chain reaction (PCR), cell, more (extra), life, two, same, less (under), human genome, Insulin and Growth hormone, against.**

32. The prefix **hyper** means: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

33. The prefix **anti** means: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

34. The process of replacing a defective gene that causes a genetic disorder with a good

gene: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

35. The complete set of genes in humans is called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

36. The physical manifestation (description) describing what a trait looks like:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

37. The prefix **hypo** means: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

38. The prefix **bio** means: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

39. Two examples where humans have genetically engineered bacteria to produce products or drugs are those to treat diabetes and dwarfism. What are the drugs?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

40. The prefix **cyto** means: \_\_\_\_\_\_\_\_\_\_\_\_\_.

41. A technique used to produce many copies of a certain gene is called:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

42. The prefixes **di** and **bi**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

43. The prefix **homo** means: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

44. The genetic make-up of a trait is represented by letters (one for each allele). For example: Rr, Tt, AA. This is referred to as the:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

45. The continued breeding of individuals with similar characteristics ensures that

offspring are homozygous for most traits, but also brings out harmful recessive traits. This is called:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.