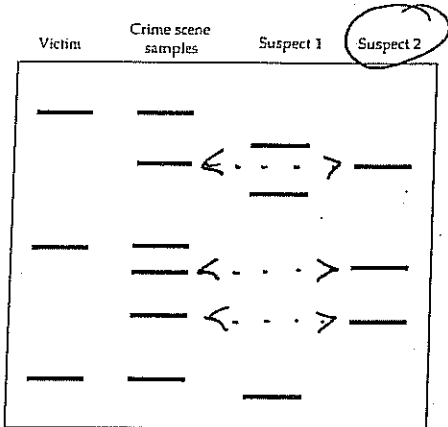


INTERACTIVE QUESTION 20.5

A bloody crime has occurred. Police have collected blood samples from the victim, two suspects, and blood found at the scene. Briefly list the steps the lab went through to produce the following autoradiograph.

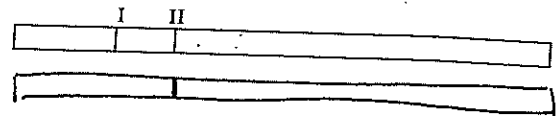
- Isolate DNA
- Gel electrophoresis
- Southern Blot
- Expose filter paper to probe
- Autoradiograph

Which suspect would you charge with the crime?



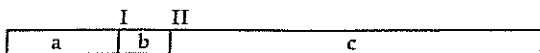
This restriction fragment contains a gene whose recessive allele is lethal. The normal allele has restriction sites for the restriction enzyme *Pst*I sites I and II. The recessive allele lacks restriction site I. An individual who had a sister with the lethal trait is being tested to determine if he is a carrier of that allele. Indicate which of these band patterns would be produced on a gel if he is a carrier (heterozygous for the gene)?

Site I is Restr. missing



- Gel showing four bands of equal width.
- Gel showing three bands: one wide and two narrow.
- Gel showing two bands: one wide and one narrow.
- Gel showing three bands: one wide and two narrow.
- Gel showing two bands: one wide and one narrow.

This segment of DNA has restriction sites I and II, which create restriction fragments a, b, and c. Which of the following gels produced by electrophoresis would represent the separation and identity of these fragments?



- Gel showing three bands labeled a, b, and c.
- Gel showing three bands labeled c, a, and b. *Smallest fragment travels farthest*
- Gel showing three bands labeled b, a, and c.
- Gel showing three bands labeled c, a, and b.
- Gel showing three bands labeled c, b, and a.

Which of the following is *not* true of recognition sequences?

- Modification by methylation of bases within them prevents restriction of bacterial DNA.
- They are usually symmetrical sequences of four to eight nucleotides.
- They signal the attachment of RNA polymerase. *No, this is true of a Promoter*
- Each recognition sequence is cut by a specific restriction enzyme.
- Cutting a recognition sequence in the middle of a functional and identifiable gene is used to screen clones that have taken up foreign DNA.

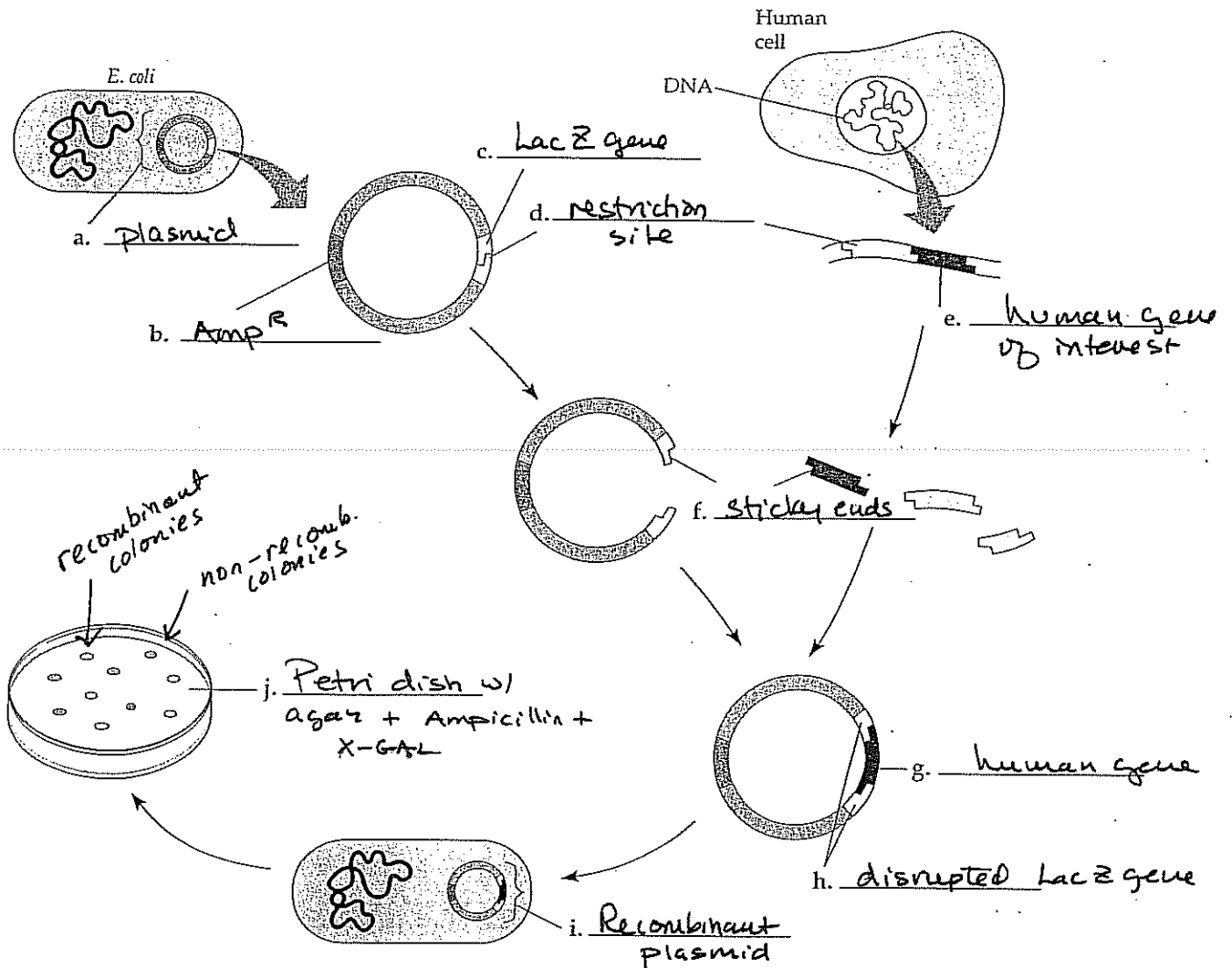
Use the following choices to answer questions

- restriction enzyme
- reverse transcriptase
- ligase
- DNA polymerase
- RNA polymerase

Which is the first enzyme used in the production of cDNA? *SKIP (reverse transcriptase)*

Which enzyme is used in the polymerase chain reaction? *DNA pol (Taq pol is a type)*

Which is the first enzyme used in the production of DNA fragments for DNA fingerprinting? *restriction enzyme*



Choose from the following types of genetic variation in bacteria to answer questions

- conjugation
- mutation
- transduction
- transformation
- transposon

When harmless *Streptococcus pneumoniae* are mixed with heat-killed, broken-open cells of pathogenic bacteria, live pneumonia-causing bacteria are found in the culture. **D**

Transfer of genes by viruses is called **C**.

Transfer of antibiotic-resistant genes to R plasmids may occur this way. **A**

The source of most of the genetic variation found in bacterial populations is **B**.

Two mutant *E. coli* strains, which cannot grow on minimal media, are grown together in complete media (all amino acids supplied). Samples are later transferred to minimal media and numerous colonies are able to grow. **A**

A plasmid has two antibiotic resistance genes, one for ampicillin and one for tetracycline. It is treated with a restriction enzyme that cuts in the middle of the ampicillin gene. DNA fragments containing a human globin gene were cut with the same enzyme. The plasmids and fragments are mixed, treated with ligase, and used to transform bacterial cells. Clones that have taken up the recombinant DNA are the ones that (*Amp gene disrupted*)

- are blue and can grow on plates with both antibiotics.
- can grow on plates with ampicillin but not with tetracycline.
- can grow on plates with tetracycline but not with ampicillin.
- cannot grow with any antibiotics.
- can grow on plates with tetracycline and are not blue. (*No info given about LacZ gene so that is irrelevant*)

Which of the following DNA sequences would most likely be a restriction site? (*Palindrome*)

- | | |
|-----------|-------------|
| a. AACCGG | d. AATTCCGG |
| TTGGCC | TTAAGGCC |
| b. GGTTGG | e. CTGCAG |
| CCAACC | GACGTC |
| c. AAGG | |
| TTCC | |