Name: _____ Date: _____ Class: _____

Assessment Questions Answer Key

1. **Describe the role of restriction enzymes in the process of transformation.**

   Restriction enzymes are used to cut the DNA of both the organism with the desired gene and the plasmid. This allows the fusion of the nitrogen base pairs of the two DNA segments.

2. **The restriction enzyme BamH1 cuts DNA between the two Gs when it encounters the base sequence.**

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

   Mark the recognition sites on the segment of DNA when the restriction enzyme BamHI is used.

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

3. **Describe how bacteria can be made to produce human insulin.**

   First, a restriction enzyme cuts both a bacterial plasmid and the human insulin gene. Then, an enzyme called ligase joins the nitrogen bases of the cut plasmid and human insulin gene together. This recreates a recombinant plasmid. Then this recombinant plasmid can be inserted into a bacterial cell. When the bacterial cell reproduces, it creates more cells that now have the recombinant plasmid and can produce the protein, insulin.

4. **Antigens are proteins that illicit an immune response from the human body. Some vaccines contain these proteins so the body can provide immunity from the pathogen, such as bacteria that harbor these harmful antigens. What might be some roles for bacteria that would benefit humans in terms of antigen production?**

   Bacteria could be genetically engineered to produce only the desired antigen proteins by creating a recombinant organism.

5. **Do you think recombinant organisms could also pose a threat to a population or ecosystem? Explain.**

   Answers will vary.