**Enzymatic restriction lab report**

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Section: \_\_\_\_\_\_\_**

1. Paste a gel image with the restriction digests and the control DNA clearly labeled, indicating the enzyme loaded on each lane, the size of the ladder bands and the estimated size for each fragment. Discuss how your *in-silico* results compare to the result of your experiment.
2. How could you explain the potential appearance of bands of sizes that do not correspond to what would be expected from the *in silico* digestion.
3. Using the sequence of *Escherichia coli’s* β-subunit of the RNA polymerase provided below, find the restriction sites and the fragments’ sizes for each of the following restriction enzymes: AatII, BseYI, EcoRI and ZraI.

>β-*RNApo*l

atggtttactcctataccgagaaaaaacgtattcgtaaggattttggtaaacgtccacaagttctggatgtaccttatctcctttctatccagcttgactcgtttcagaaatttatcgagcaagatcctgaagggcagtatggtctggaagctgctttccgttccgtattcccgattcagagctacagcggtaattccgagctgcaatacgtcagctaccgccttggcgaaccggtgtttgacgtccaggaatgtcaaatccgtggcgtgacctattccgcaccgctgcgcgttaaactgcgtctggtgatctatgagcgcgaagcgccggaaggcaccgtaaaagacattaaagaacaagaagtctacatgggcgaaattccgctcatgacagacaacggtacctttgttatcaacggtactgagcgtgttatcgtttcccagctgcaccgtagtccgggcgtcttctttgactccgacaaaggtaaaacccactcttcgggtaaagtgctgtataacgcgcgtatcatcccttaccgtggttcctggctggacttcgaattcgatccgaaggacaacctgttcgtacgtatcgaccgtcgccgtaaactgcctgcgaccatcattctgcgcgccctgaactacaccacagagcagatcctcgacctgttctttgaaaaagttatctttgaaatccgtgataacaagctgcagatggaactggtgccggaacgcctgcgtggtgaaaccgcatcttttgacatcgaagctaacggtaaagtgtacgtagaaaaaggccgccgtatcactgcgcgccacattcgccagctggaaaaagacgacgtcaaactgatcgaagtcccggttgagtacatcgcaggtaaagtggttgctaaagactatattgatgagtctaccggcgagctgatctgcgcagcgaacatggagctgagcctggatctgctggctaagctgagccagtctggtcacaagcgtatcgaaacgctgttcaccaacgatctggatcacggcccatatatctctgaaaccttacgtgtcgacccaactaacgaccgtctgagcgcactggtagaaatctaccgcatgatgcgccctggcgagccgccgactcgtgaagcagctgaaagcctgttcgagaacctgttcttctccgaagaccgttatgacttgtctgcggttggtcgtatgaagttcaaccgttctctgctgcgcgaagaaatcgaaggttccggtatcctgagcaaagacgacatcattgatgttatgaaaaagctcatcgatatccgtaacggtaaaggcgaagtcgatgatatcgaccacctcggcaaccgtcgtatccgttccgttggcgaaatggcggaaaaccagttccgcgttggcctggtacgtgtagagcgtgcggtgaaagagcgtctgtctctgggcgatctggataccctgatgccacaggatatgatcaacgccaagccgatttccgcagcagtgaaagagttcttcggttccagccagctgtctcagtttatggaccagaacaacccgctgtctgagattacgcacaaacgtcgtatctccgcactcggcccaggcggtctgacccgtgaacgtgcaggcttcgaagttcgagacgtacacccgactcactacggtcgcgtatgtccaatcgaaacccctgaaggtccgaacatcggtctgatcaactctctgtccgtgtacgcacagactaacgaatacggcttccttgagactccgtatcgtaaagtgaccgacggtgttgtaactgacgaaattcactacctgtctgctatcgaagaaggcaactacgttatcgcccaggcgaactccaacttggatgaagaaggccacttcgtagaagacctggtaacttgccgtagcaaaggcgaatccagcttgttcagccgcgaccaggttgactacatggacgtatccacccagcaggtggtatccgtcggtgcgtccctgatcccgttcctggaacacgatgacgccaaccgtgcattgatgggtgcgaacatgcaacgtcaggccgttccgactctgcgcgctgataagccgctggttggtactggtatggaacgtgctgttgccgttgactccggtgtaactgcggtagctaaacgtggtggtgtcgttcagtacgtggatgcttcccgtatcgttatcaaagttaacgaagacgagatgtatccgggtgaagcaggtatcgacatctacaacctgaccaaatacacccgttctaaccagaacacctgtatcaaccagatgccgtgtgtgtctctgggtgaaccggttgaacgtggcgacgtgctggcagacggtccgtccaccgacctcggtgaactggcgcttggtcagaacatgcgcgtagcgttcatgccgtggaatggttacaacttcgaagactccatcctcgtatccgagcgtgttgttcaggaagaccgtttcaccaccatccacattcaggaactggcgtgtgtgtcccgtgacaccaagctgggtccggaagagatcaccgctgacatcccgaacgtgggtgaagctgcgctctccaaactggatgaatccggtatcgtttacattggtgcggaagtgaccggtggcgacattctggttggtaaggtaacgccgaaaggtgaaactcagctgaccccagaagaaaaactgctgcgtgcgatcttcggtgagaaagcctctgacgttaaagactcttctctgcgcgtaccaaacggtgtatccggtacggttatcgacgttcaggtctttactcgcgatggcgtagaaaaagacaaacgtgcgctggaaatcgaagaaatgcagctcaaacaggcgaagaaagacctgtctgaagaactgcagatcctcgaagcgggtctgttcagccgtatccgtgctgtgctggtagccggtggcgttgaagctgagaagctcgacaaactgccgcgcgatcgctggctggagctgggcctgacagacgaagagaaacaaaatcagctggaacagctggctgagcagtatgacgaactgaaacacgagttcgagaagaaactcgaagcgaaacgccgcaaaatcacccagggcgacgatctggcaccgggcgtgctgaagattgttaaggtatatctggcggttaaacgccgtatccagcctggtgacaagatggcaggtcgtcacggtaacaagggtgtaatttctaagatcaacccgatcgaagatatgccttacgatgaaaacggtacgccggtagacatcgtactgaacccgctgggcgtaccgtctcgtatgaacatcggtcagatcctcgaaacccacctgggtatggctgcgaaaggtatcggcgacaagatcaacgccatgctgaaacagcagcaagaagtcgcgaaactgcgcgaattcatccagcgtgcgtacgatctgggcgctgacgttcgtcagaaagttgacctgagtaccttcagcgatgaagaagttatgcgtctggctgaaaacctgcgcaaaggtatgccaatcgcaacgccggtgttcgacggtgcgaaagaagcagaaattaaagagctgctgaaacttggcgacctgccgacttccggtcagatccgcctgtacgatggtcgcactggtgaacagttcgagcgtccggtaaccgttggttacatgtacatgctgaaactgaaccacctggtcgacgacaagatgcacgcgcgttccaccggttcttacagcctggttactcagcagccgctgggtggtaaggcacagttcggtggtcagcgtttcggggagatggaagtgtgggcgctggaagcatacggcgcagcatacaccctgcaggaaatgctcaccgttaagtctgatgacgtgaacggtcgtaccaagatgtataaaaacatcgtggacggcaaccatcagatggagccgggcatgccagaatccttcaacgtattgttgaaagagattcgttcgctgggtatcaacatcgaactggaagacgagtaa

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| **Enyzme** | **Restriction fragments sizes** |
| AatII |  |
| BseYI |  |
| EcoRI |  |
| ZraI |  |

1. Digest *Escherichia coli*’s 16S rRNA gene with enzymes EcoRI, MluI and BbrpI and draw an agarose gel with the predicted bands resulting from the single, double and triple digestions: E, M, B, E+M, E+B, M+B and E+M+B.

>16S rRNA

aaattgaagagtttgatcatggctcagattgaacgctggcggcaggcctaacacatgcaagtcgaacggtaacaggaagaagcttgcttctttgctgacgagtggcggacgggtgagtaatgtctgggaaactgcctgatggagggggataactactggaaacggtagctaataccgcataacgtcgcaagaccaaagagggggaccttcgggcctcttgccatcggatgtgcccagatgggattagctagtaggtggggtaacggctcacctaggcgacgatccctagctggtctgagaggatgaccagccacactggaactgagacacggtccagactcctacgggaggcagcagtggggaatattgcacaatgggcgcaagcctgatgcagccatgccgcgtgtatgaagaaggccttcgggttgtaaagtactttcagcggggaggaagggagtaaagttaatacctttgctcattgacgttacccgcagaagaagcaccggctaactccgtgccagcagccgcggtaatacggagggtgcaagcgttaatcggaattactgggcgtaaagcgcacgcaggcggtttgttaagtcagatgtgaaatccccgggctcaacctgggaactgcatctgatactggcaagcttgagtctcgtagaggggggtagaattccaggtgtagcggtgaaatgcgtagagatctggaggaataccggtggcgaaggcggccccctggacgaagactgacgctcaggtgcgaaagcgtggggagcaaacaggattagataccctggtagtccacgccgtaaacgatgtcgacttggaggttgtgcccttgaggcgtggcttccggagctaacgcgttaagtcgaccgcctggggagtacggccgcaaggttaaaactcaaatgaattgacgggggcccgcacaagcggtggagcatgtggtttaattcgatgcaacgcgaagaaccttacctggtcttgacatccacagaactttccagagatggattggtgccttcgggaactgtgagacaggtgctgcatggctgtcgtcagctcgtgttgtgaaatgttgggttaagtcccgcaacgagcgcaacccttatcttttgttgccagcggtccggccgggaactcaaaggagactgccagtgataaactggaggaaggtggggatgacgtcaagtcatcatggcccttacgaccagggctacacacgtgctacaatggcgcatacaaagagaagcgacctcgcgagagcaagcggacctcataaagtgcgtcgtagtccggattggagtctgcaactcgactccatgaagtcggaatcgctagtaatcgtggatcagaatgccacggtgaatacgttcccgggccttgtacacaccgcccgtcacaccatgggagtgggttgcaaaagaagtaggtagcttaaccttcgggagggcgcttaccactttgtgattcatgactggggtgaagtcgtaacaaggtaaccgtaggggaacctgcggttggatcacctcctta

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| --- | --- |
| **Enyzme** | **Restriction fragments sizes** |
| EcoRI |  |
| MluI |  |
| BbrpI |  |
| E + M |  |
| M + B |  |
| E + M + B |  |

1. Describe two molecular or cell biology applications of restriction enzymes.