

RFLP's & POLYMORPHISMS

RFLP's (riff-lips) are "Restriction Fragment Length Polymorphisms."

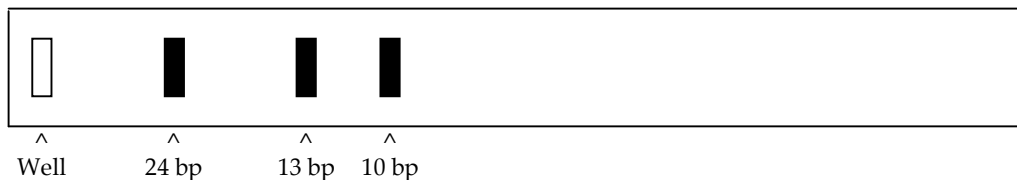
Polymorphisms are differences in a DNA sequence because of mutations (changes) in the sequence. These changes can be single base pair changes, deletions, insertions, repetitions, and substitutions.

When DNA is cut into fragments by restriction enzymes, the polymorphisms will cause the DNA to be cut in different fragments. When the DNA is electrophoresed, there will be a different banding pattern. Every living organism (except exact clones/identical twins) has harmless polymorphisms that make their banding pattern unique.

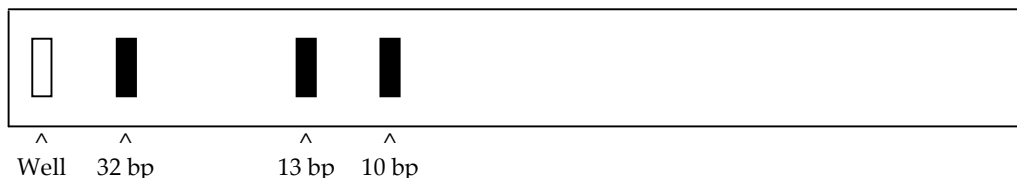
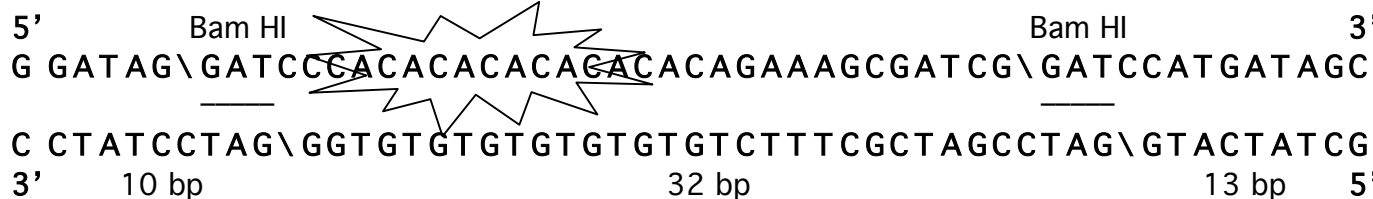
Endonucleases (restriction enzymes) were discovered in the late 1960's and were found to be the natural weapons of bacteria to protect themselves against invading viruses. Some viruses have endonucleases as well, and use them to cut into a host cells DNA in order to insert their own. Endonucleases are named according to when and where they were isolated: BamHI came from genus *Bacillus*, species *amyloliquifaciens*, strain H and was the first (I) one isolated. Bam cuts DNA where ever it finds a palindrome of GGATCC, and cuts between the two Gs.

EXAMPLE: RFLP due to an 8bp repetitive DNA insertion

DNA SAMPLE A



DNA SAMPLE B



***RFLP LEARNING ASSESSMENT
CHECKING FOR UNDERSTANDING:***

One of the simplest ways to collect large amounts of DNA for analysis is from cells found in the elephant's dung. This is exactly what Wasser and Comstock and other scientists use for their DNA analysis of elephant families and individuals.

Below, you are given two sections of DNA that represent segments from elephants. Using what you know about BamHI, RFLPs and electrophoresis, **cut the following DNA segments, and tape/glue the pieces (according to how they would electrophorese) to the picture of the gel on the following page. Answer the questions.**

Dung Pile X

TAAAGGATCCCCTAGCTAGGATCCTATATACCATATACGAG
ATTCCTAGGGGATCGATCCTAGGATATATGGTATATGCTC

Dung Pile Y

TAAAGGATCCCCTATATACCCGAGGTACCAGGATCCTAGTC
ATTCCTAGGGGATATATGGGCTCCATGGTCCCTAGGATCAG



RFLP ASSESSMENT

NAME _____

PERIOD _____ **DATE** _____

Dung Pile X	Dung Pile Y
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1. Compare and contrast the banding patterns between X and Y.
2. How many restriction sites does each DNA sample have? X____ Y____
3. Explain why the two dung piles have different DNA banding patterns using the concept of RFLPs.
4. If the elephants are sisters, what might we expect to see in their RFLP patterns?
5. Predict what you would expect to see if the elephants are NOT related?

