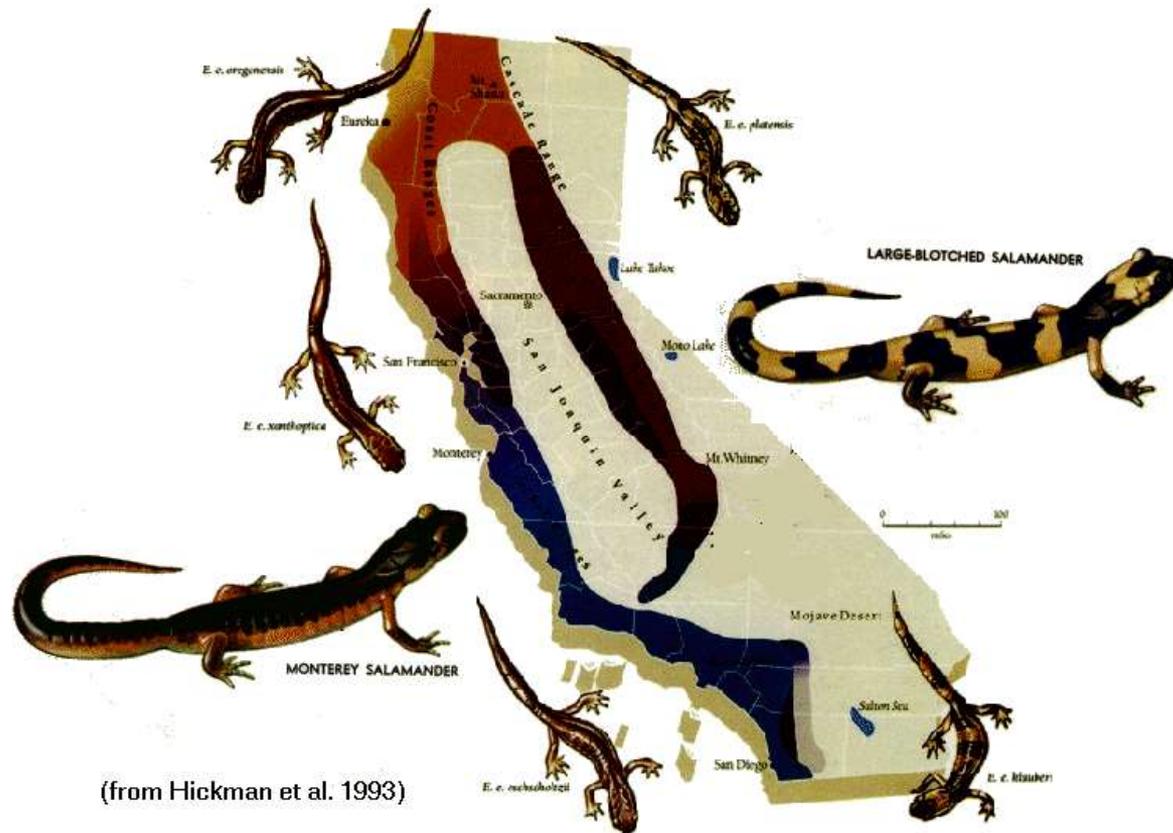


# Genetic Variation

- Most genes have small sequence differences between individuals
  - Occur every 1350 bp on average
- Some of these polymorphisms may affect:
  - How well the protein works
  - How the protein interacts with another protein or substrate
- The different gene forms containing polymorphisms are called alleles

# Between-population variation



## Salamanders

# Within-population variation



Hawaiian Happy-face spiders, *Theridion grallator*

## Restriction Fragment Length Polymorphism

- Some genetic polymorphisms can be identified by the presence or absence of a specific restriction endonuclease recognition site: For example:

## RFLP Analysis

GAATTC versus **GATTTC**

**RFLP analysis is the detection of the change in the length of the restriction fragments as a result of these mutations.**

# A Single Point Mutation can lead to Loss or Gain of a Restriction Endonuclease Site

**EcoR1**

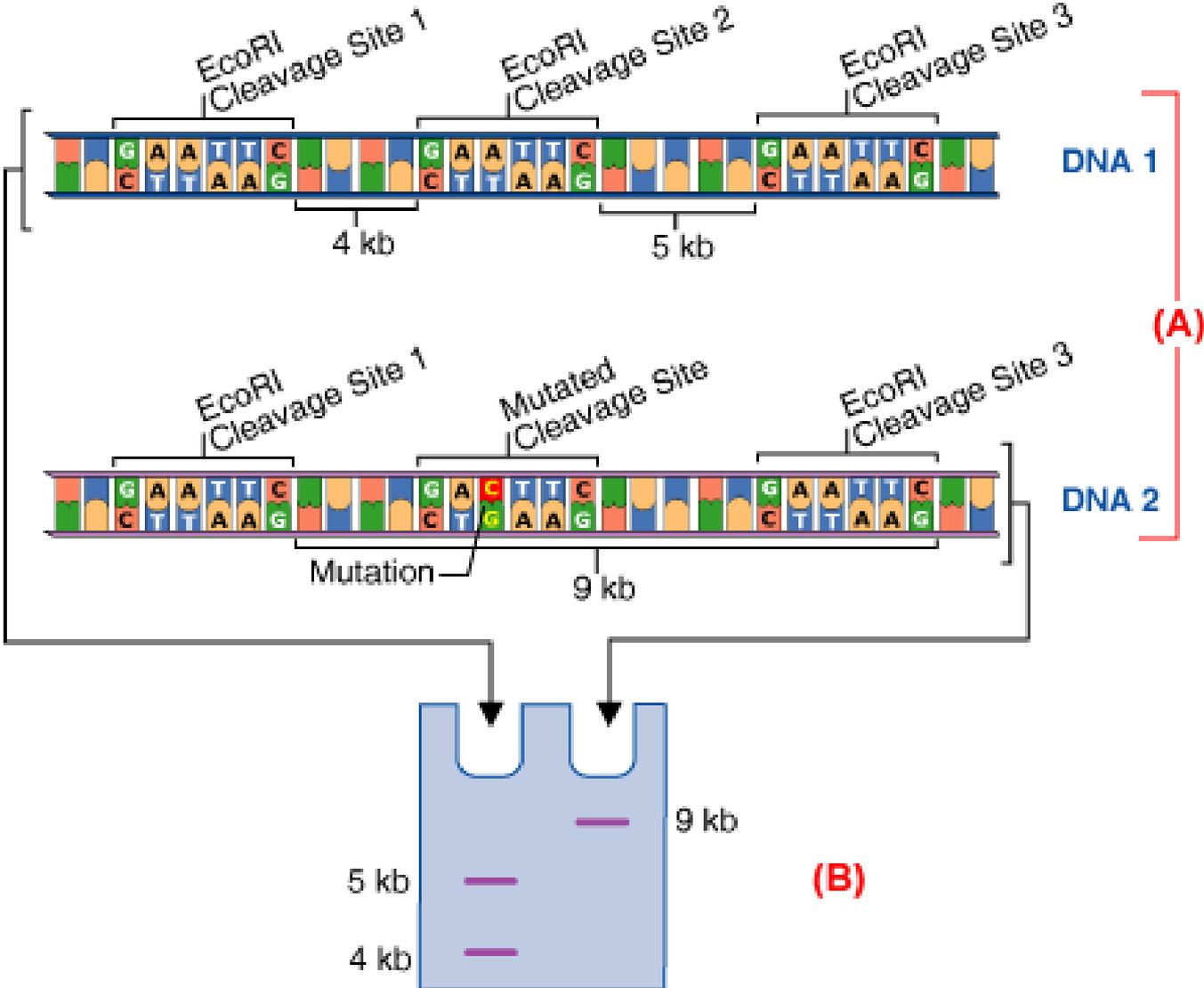
**EcoR1**

TTCGTC**GAATTC**GTATGC**GAATTC**CTGCATAATGGTC

**EcoR1**

TTCGTC**GAATTC**GTATGC**T**AATTCCTGCATAATGGTC

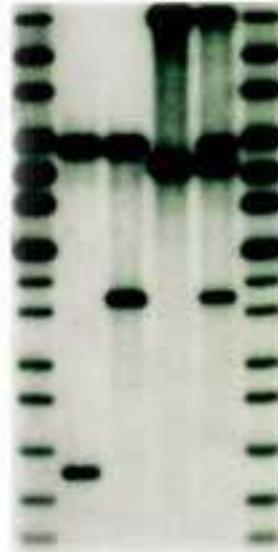
# Reflection in RFLP Pattern



# Paternity Testing

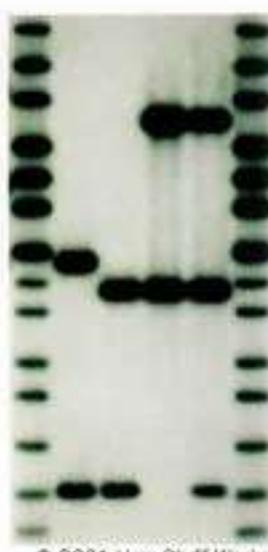
## Paternity Exclusion

LADDER  
Mother  
Child  
Alleged Father  
C/AF Mix  
LADDER



## Paternity Inclusion

LADDER  
Mother  
Child  
Alleged Father  
C/AF Mix  
LADDER



# Criminal cases

## Sexual Assault Case

