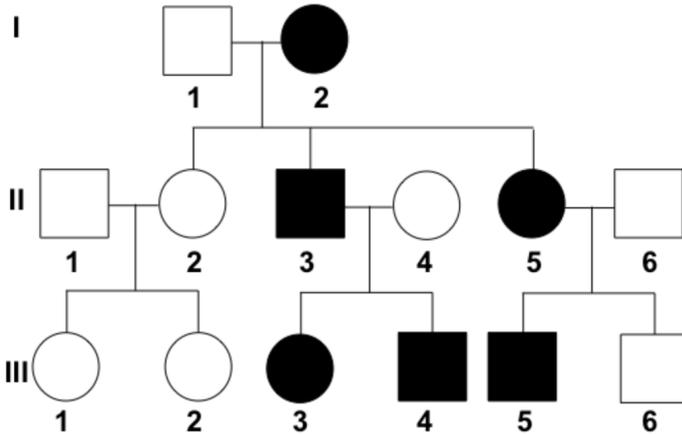


Indicate which of the following phenomena (A-H) is at work.

- A. Lethal alleles - B
  - B. Multiple alleles - F
  - C. Epistasis - E
  - D. Incomplete penetrance - A
  - E. Variable expressivity - C
  - F. Pleiotropy - G
  - G. A phenocopy - D
  - H. Genetic heterogeneity
  - I. Codominance - H
- 
- a. A woman with severe neurofibromatosis type 1 has brown spots on her skin and several large tumors beneath her skin. A genetic test shows that her son has the disease-causing autosomal dominant allele, but he has no symptoms.
  - b. A man and woman have six children. They also had two stillbirths - fetuses that stopped developing shortly before birth.
  - c. Mutations in a gene that encodes a muscle protein called titin cause 22 percent of cases of inherited dilated cardiomyopathy, a form of heart disease. Other single genes cause the other cases.
  - d. A woman with dark brown skin uses a bleaching cream that darkens her finger tips and ears, making her look like she has the inherited disease alkaptonuria.
  - e. In labrador retrievers, the B allele confers black coat color and the b allele brown coat color. The E gene controls the expression of the B gene. If a dog inherits the E allele, the coat is golden no matter what the B genotype is. A dog of

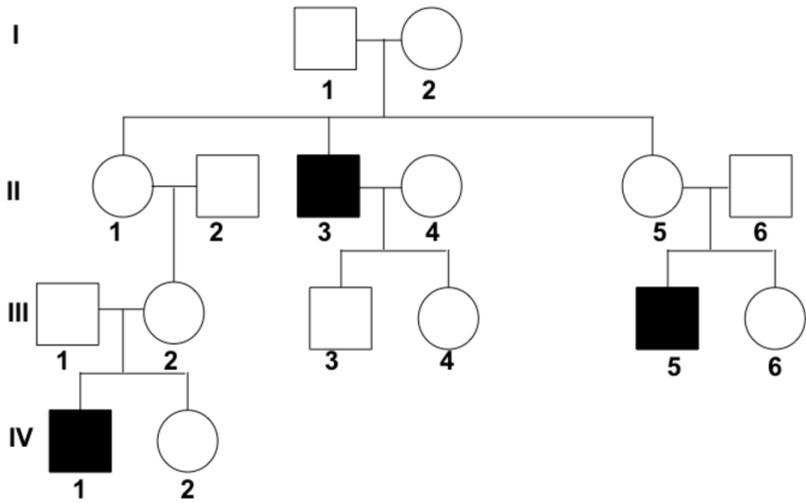
- genotype  $ee$  expresses the B phenotype.
- f. Two parents are heterozygous for genes that cause albinism, but each gene specifies a different enzyme in the biochemical pathway for skin pigment synthesis. Their children thus do not face a 25 percent risk of having albinism.
  - g. Cystic fibrosis Transmembrane Conductance Regulator (CFTR) gene is expressed in many different tissues.
  - h. An offspring of a chicken grows up to exhibit white and black feathers. The parents are black-feathered chicken and white-feathered chicken.



i.

1. Which inheritance patterns does the above pedigree show?

*Autosomal Dominant  
Inheritance*

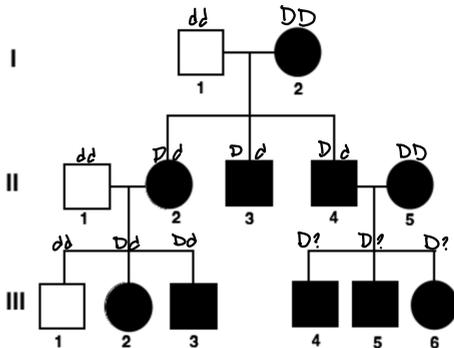


2. Which inheritance patterns does the above pedigree show?

*X-linked recessive traits*



The pedigree below tracks the presence of dimples through a family's generation. Having dimples is an autosomal dominant trait.



3. Which of the following individuals is correctly matched with its genotype?

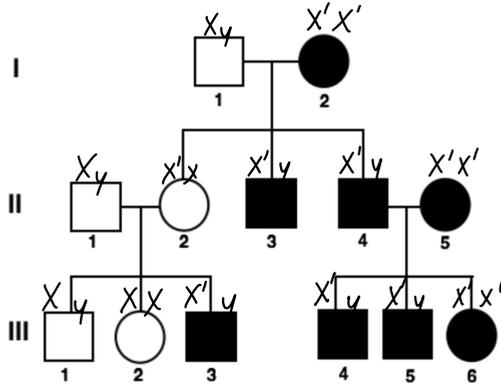
~~A. II-3 → dd~~

~~B. II-2 → DD~~

*Option C*

- C. III-2 → Dd  
 D. I-1 → Dd

The pedigree below tracks Duchenne Muscular Dystrophy (DMD) through several generations. DMD is an X-linked recessive trait.



If individuals I-1 and I-2 had another son, what is the chance that he would have DMD?

4.

- a. 0%  
 b. 25%  
 c. 50%

d. 100%