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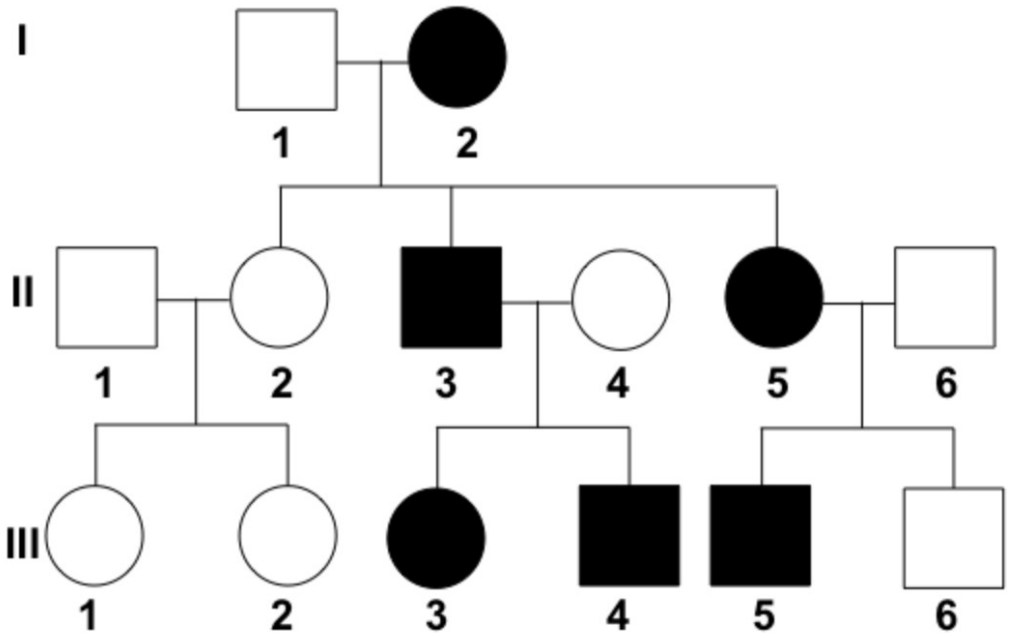
Indicate which of the following phenomena (A-H) is at work.

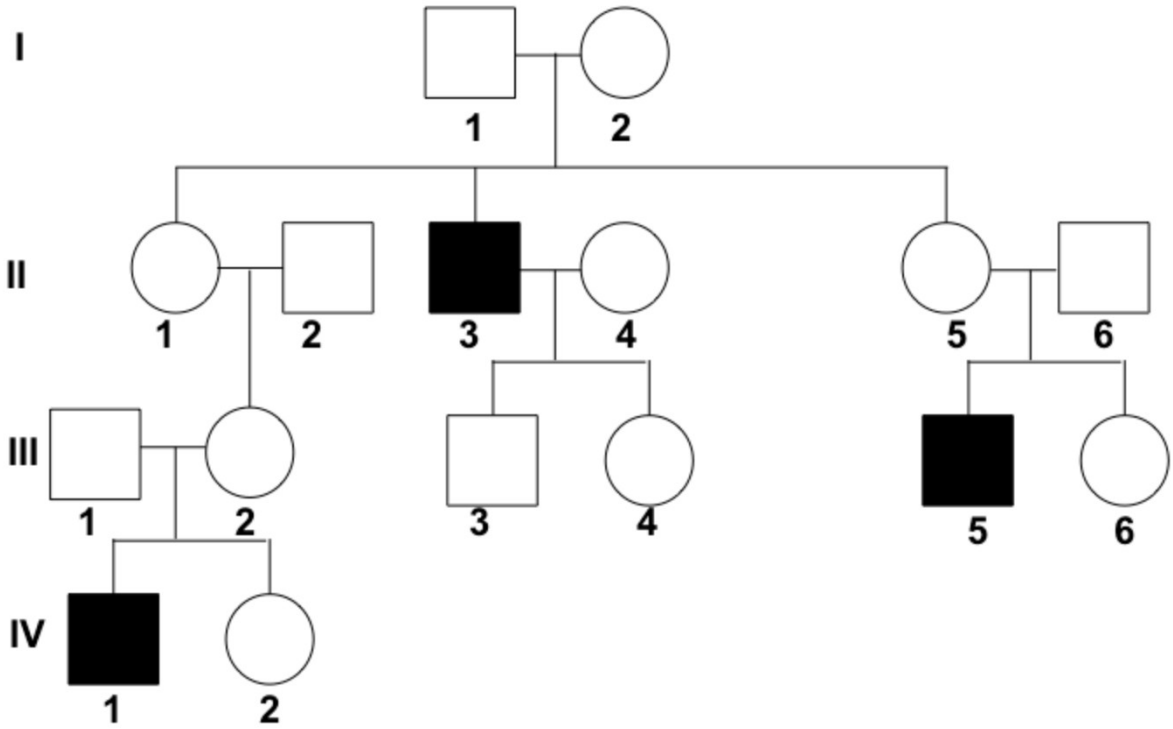
A. Lethal alleles
B. Multiple alleles
C. Epistasis
D. Incomplete penetrance
E. Variable expressivity
F. Pleiotropy
G. A phenocopy
H. Genetic heterogeneity
I. Codominance

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**
b. A man and woman have six children. They also had two stillbirths - fetuses that stopped developing shortly before birth. = **A**
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. = E
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. = **G**
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. = **C**
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. **= H**
g. Cystic fibrosis Transmembrane Conductance Regulator (CFTR) gene is expressed in many different tissues. **= F**
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**



i.

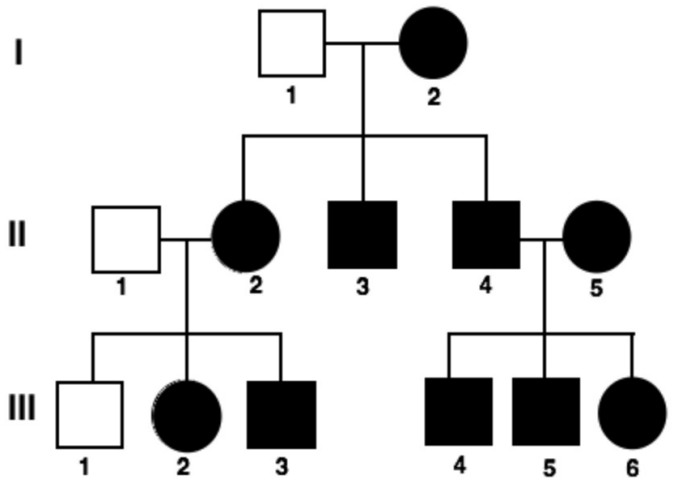
1. **Which inheritance patterns does the above pedigree show? Autosomal Dominant**



2. **Which inheritance patterns does the above pedigree show? X-linked Recessive**

AUTOSOMAL RECESSIVE

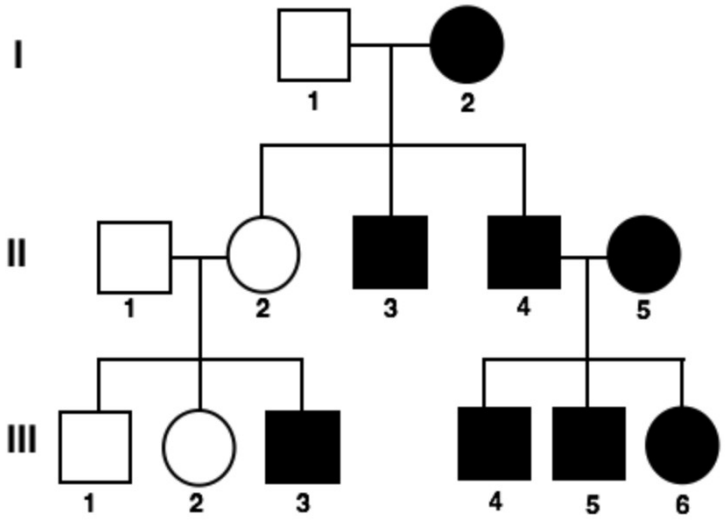
The pedigree below tracks the presence of dimples through a family's generation. Having dimples is an autosomal dominant trait.



3. **Which of the following individuals is correctly matched with its genotype?**
   - A. **II-3 → dd**
   - B. **II-2 → DD**
   - C. **III-2 → Dd**
   - D. **I-1 → Dd**

C

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%

D

https://ib.bioninja.com.au/standard-level/topic-3-genetics/34-inheritance/pedigree-charts.html