

## CHAPTER 14 VARIATIONS OF INHERITANCE

- **CODOMINANCE: INCOMPLETE**
- **BLENDING TRAIT EFFECT**
- **RED/WHITE/PINK FLOWERS**
- **RED/WHITE/ROAN CATTLE COLOR**
- **P1 RR X rr = F1 = 100% Rr**
- **P2 Rr X Rr = F2 = 25% RR, 50% Rr, and 25% rr.**
- **GR: 1:2:1, PR: 1:2:1 (blending effect Rr)**

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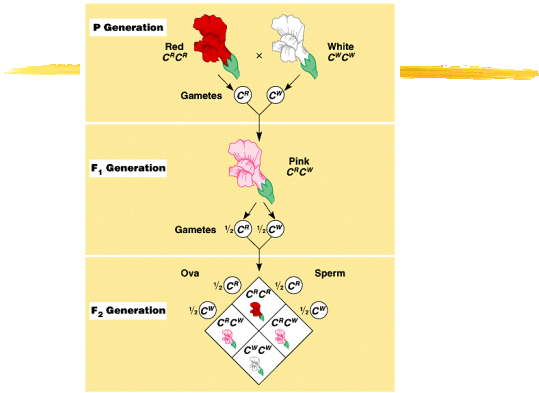
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Figure 14.9 Incomplete dominance in snapdragon color




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Figure 14.9x Incomplete dominance in carnations




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# CODOMINANCE: MULTIPLE ALLES

- ▮ ABO BLOOD GROUPS
- ▮ SURFACE ANTIGENS
- ▮ TYPE A =  $I^A I^A$ ,  $I^A i$
- ▮ TYPE B =  $I^B I^B$ ,  $I^B i$
- ▮ TYPE AB =  $I^A I^B$
- ▮ TYPE O =  $ii$
- ▮ problems: TYPE A X TYPE B = ?

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Figure 14.10 Multiple alleles for the ABO blood groups

(a) Phenotype (blood group)	(b) Genotypes (see p.258)	(c) Antibodies present in blood serum	(d) Results from adding red blood cells from groups below to serum from groups at left			
			A	B	AB	O
A	$I^A I^A$ or $I^A i$	Anti-B				
B	$I^B I^B$ or $I^B i$	Anti-A				
AB	$I^A I^B$	—				
O	$ii$	Anti-A Anti-B				

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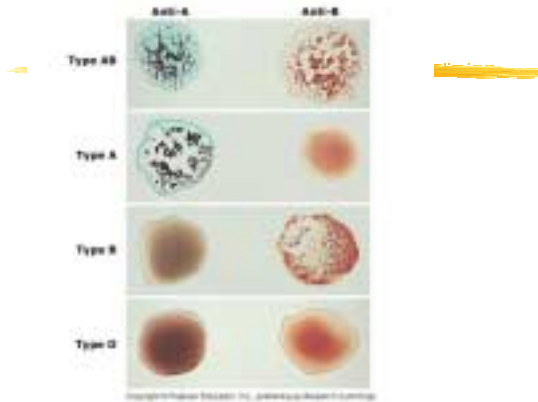
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Figure 14.10x ABO blood types




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## MULTIPLE EFFECTS OF SINGLE GENES

- **EPISTASIS:**
- **EXPRESSION IN PIGMENT PRODUCTION/COAT COLOR IN ANIMALS**
- **SHARPEI DOGS/ MELANIN PROD.**
- **WHITE, CREAM, BLACK, AUBURN**
- **SS, Ss, ss mixed expression. Other gene?**

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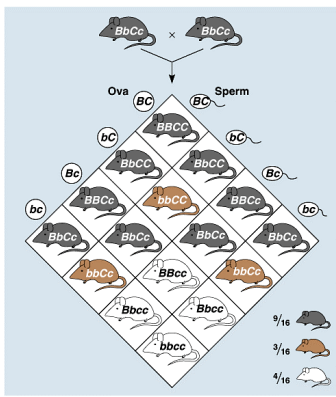
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Figure 14.11 An example of epistasis



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## MULTIPLE EFFECTS OF SINGLE GENES

- **PENETRANCE: ALL OR NONE**
- **MODE OF EXPRESSIVITY**
- **PP, Pp = PURPLE, pp = WHITE**
- **CONTINUOUS VARIATION:**
- **HEIGHT, SKIN COLOR, BODY BUILD**
- **RANGE OF PHENOTYPES**

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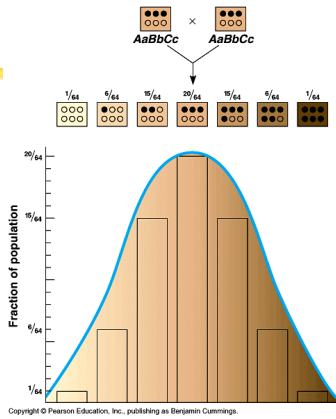
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Figure 14.12 A simplified model for polygenic inheritance of skin color




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## Multiple Effects of Single Genes

- **Gene Expression:** environment
- RABBITS/NORTH/WHITE
- RABBITS/SOUTH/DARKER
- TEMPERATURE RELATED
- AQUATIC PLANTS: CHANGE LEAF MORPHOLOGY WITH CO<sub>2</sub> CHANGES.

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Figure 14.13 The effect of environment of phenotype




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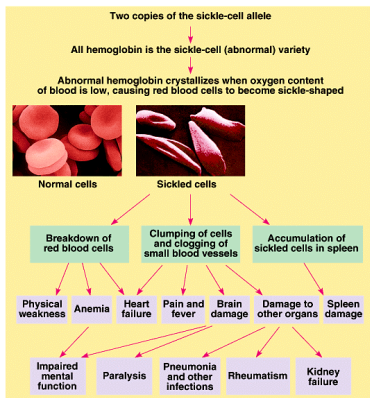
Figure 14.14 Pedigree analysis



## MULTIPLE EFFECTS OF SINGLE GENES

- **PLEIOTROPY**
- **SINGLE GENE EXERTS EFFECTS ON UNRELATED PHENOTYPE.**
- **SICKLE CELL DISEASE**
- **Hb HEMOGLOBIN, RBC SHAPE**
- **HbAHbA = normal Hb**
- **HbSHbS = sickle cell**
- **HbA HbS = carrier/Malaria**

Figure 14.15 Pleiotropic effects of the sickle-cell allele in a homozygote



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Figure 14.16 Large families provide excellent case studies of human genetics



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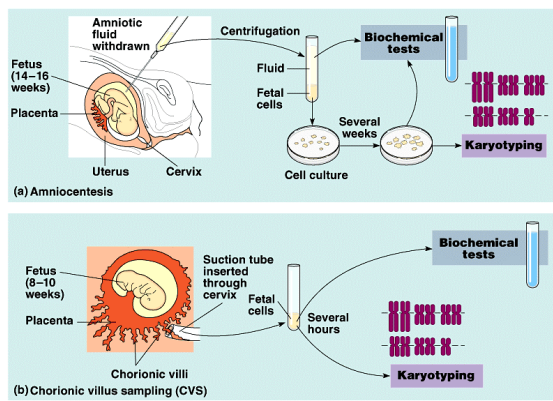
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Figure 14.17 Testing a fetus for genetic disorders



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