Lecture 10-environmental effects
I. General
   A. environmental refers to genetic or physical
      1. genetic
      2. physical

   B. Can be seen as altered penetrance of expressivity
      - Why?

II. Genetic constitution
   A. genetic make-up affects expression of traits
      1. Often difficult to know precise genetic components that affect phenotypic
         expression
         - two exceptions
         1. genetic suppression
         2. position effect

   B. Age of onset – expression of mutant phenotype may depend on age of individual
      1. Tay-Sachs - lethal defect in lipid metabolism
         2. Lesch-Nyhan - lethal defect in HGPRT enzyme
         3. Duchenne muscular dystrophy - muscle degeneration
         4. Huntington’s chorea - neurodegeneration

   C. gender - expression of mutant phenotype may depend on gender
      1. sex-limited
      2. sex-influenced

   D. genetic anticipation – occurrence of genetic disorder at progressively earlier ages in
      subsequent generations
      1. Earlier onset correlates with more severe defect.
      2. eg. Myotonic dystrophy
III. Physical environment
   A. conditional mutations
      1. Defect only seen under certain conditions
      2. Types of conditional mutations
         a. temperature sensitive
            i. Himalayan rabbit
            ii. yeast cell cycle
         b. nutritional effect
            i. mutations in enzymes required to synthesize compound
            ii. human mutations that block metabolism
               a. phenylketonuria
               b. galactosemia

IV. Acquired characteristics
   - belief that traits influenced by environment can be passed on to offspring
   - an example of one way that environment does NOT influence traits