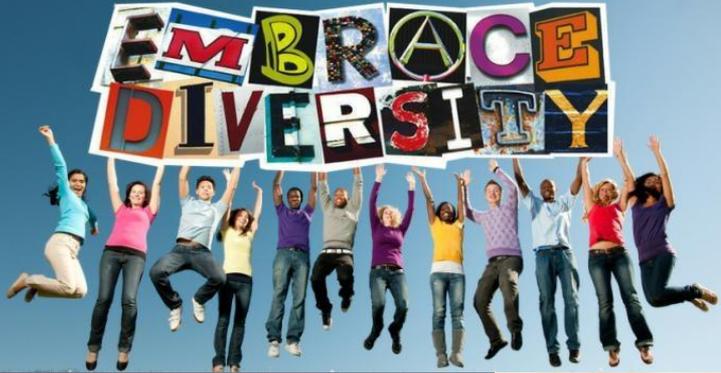
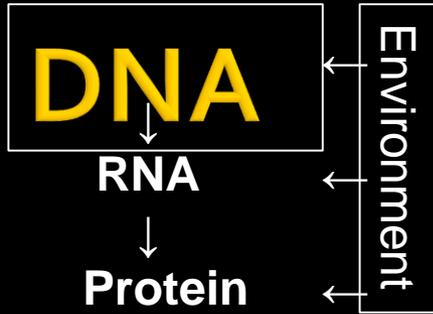


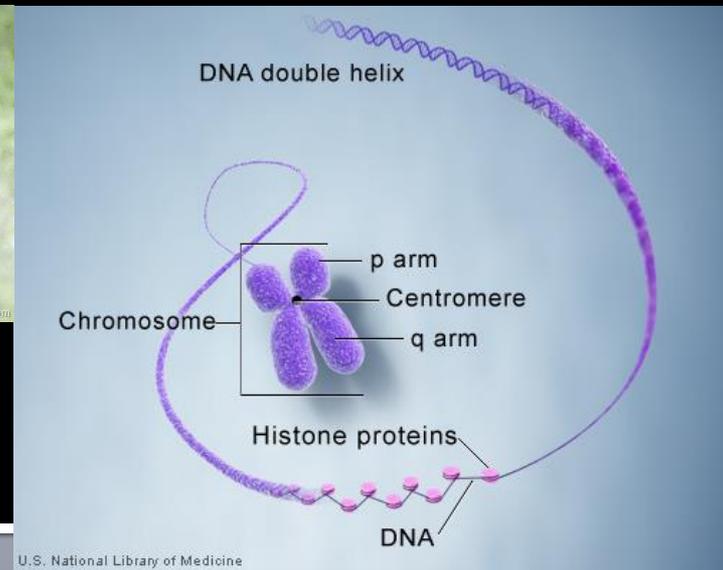
The science of inheritance

Genetics

The central dogma of MCB:



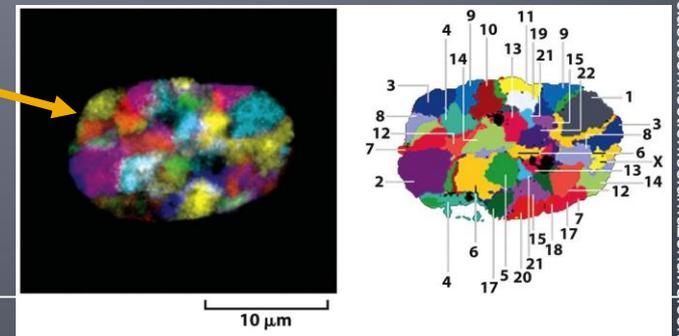
Basic terms I.



Chromosome = a continuous piece of DNA

- 22 pairs of numbered autosomes + one pair of sex chromosomes, X and Y / humans
- each parent contributes one chromosome to each pair (homologous chromosomes)
- condensed (well stainable) bodies in dividing cells ↔ more relaxed chromatin, occupying „chromosome territories” in the nucleus of interphase cells

+ circular chromosomes / dsDNA in mitochondria



Basic terms II.

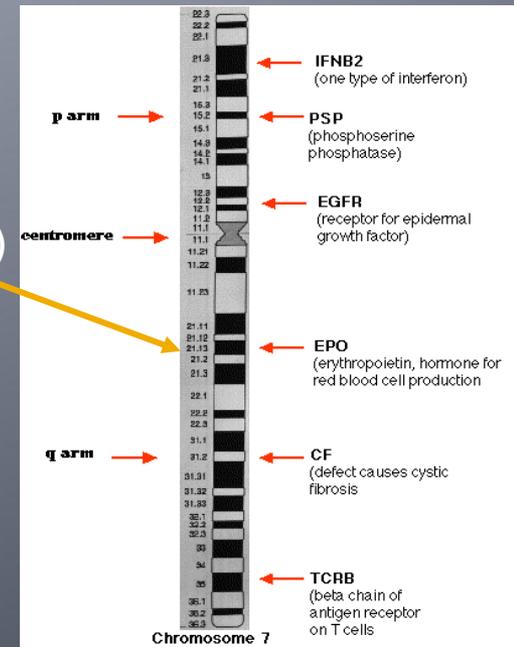
Gene = the unit of inheritance, a DNA segment → a functional (m)RNA → a protein /
/ a feature

Allele = the variant of a gene (normal / wild type or mutant)

Genetic locus = the exact location of a gene on a chromosome
(eg. 7q21.13 for EPO)

Genotype = the complete genetic makeup

Phenotype = the observable characteristics / traits
(how we look like / function)



Basic terms III.

Diploid ($2n$) cell / organism = contains two homologous copies of each chromosome
(except X & Y in males = hemizygous situation)

Haploid (n) = having only one complete set of chromosomes, half of the normal,
diploid number

Homozygous = having identical genes in corresponding genetic loci
of homologous chromosomes

Heterozygous = having different alleles in corresponding genetic loci
of homologous chromosomes

Basic terms IV.

The strength of genes = their ability to express the coded property in the phenotype:

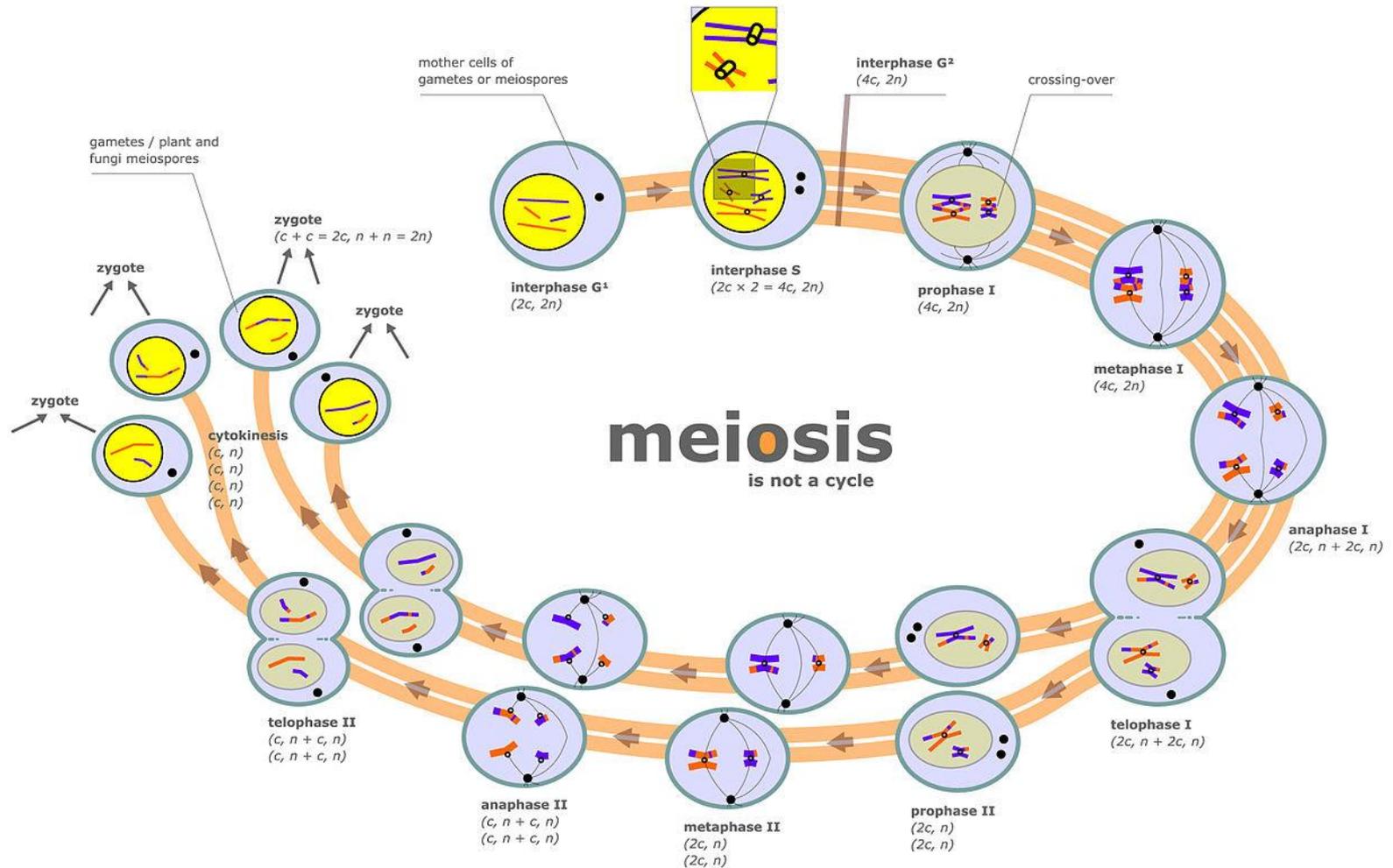
Dominant = a single copy / heterozygosity is enough for its manifestation
(eg. gain-of-function / mutation, haplo-insufficiency, dominant negative mutation, temporal or spatial alterations in the expression of a gene)

Recessive = manifestation only in homozygotes
(eg. partial / complete loss-of-function mutation)

Incomplete dominance = the feature's manifestation is halfway between the extremes coded by the alleles

Codominance = both coded extremes are equally manifested

Meiosis in females and in males I



Meiosis in females and in males

II

