Eukaryotic genome structure. Features of the structure of eukaryotic genes.

I. Human Heredity

A. Human chromosomes

1. A picture of chromosomes arranged in a picture is called a karyotype.

B. Human Traits

1. Human genes are inherited according to the same principals that Mendel discovered.

2. A pedigree chart shows relationships within a family.

C. Human Genes

1. The human genome- our complete set of genetic information includes tens of thousands of genes.

2. Some of the very first genes to be identified were those that control blood type.

D. Blood Group Genes

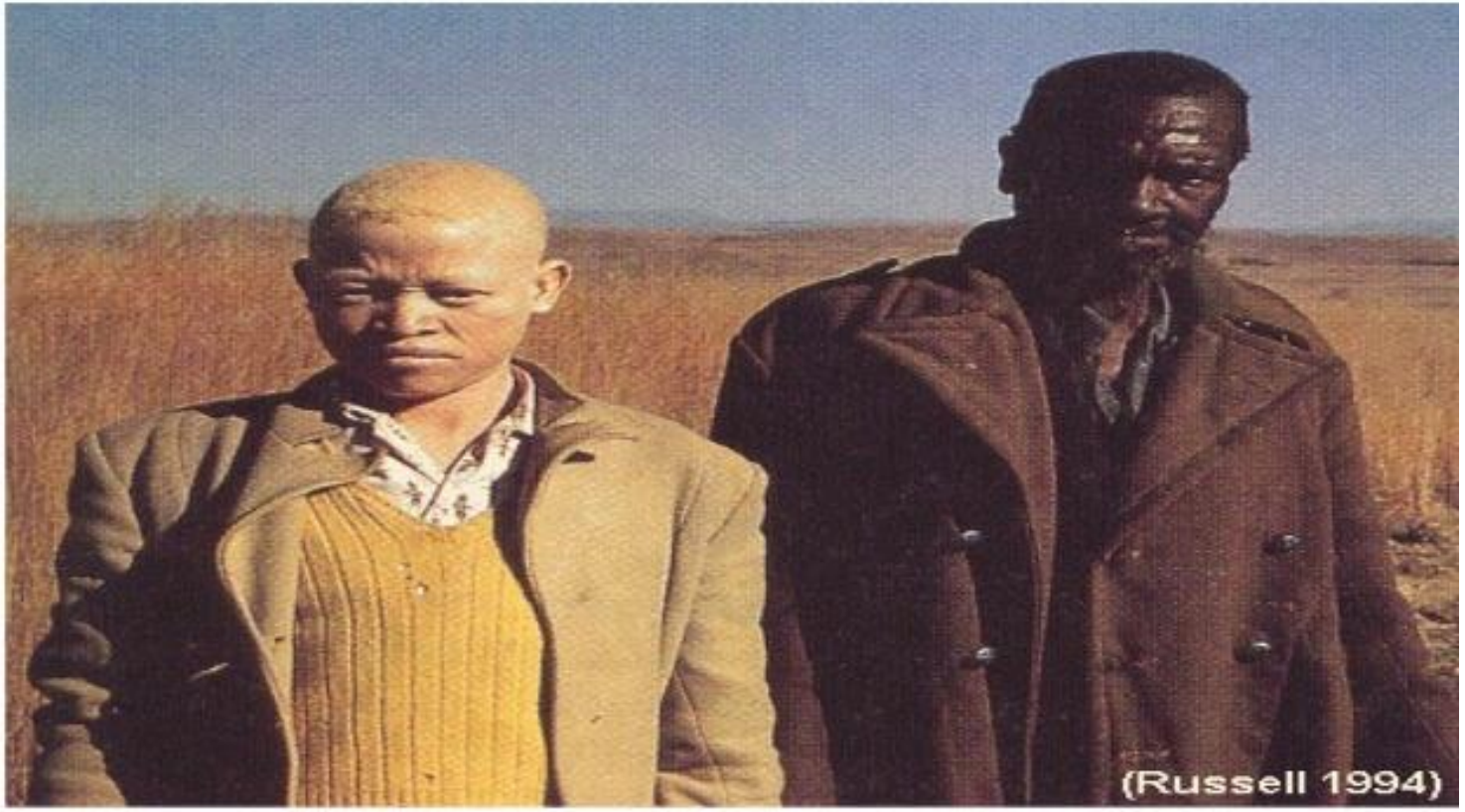
1. Human blood comes in a variety of genetically determined blood groups.

2. The different blood types are A, B, AB O plus there is a Rh+ or Rh- factor.

E. Recessive Alleles

- Many human genes have became known throuth the study of genetic disorders.
- In most cases genetic disorders are USUALLY recessive.

Albinism

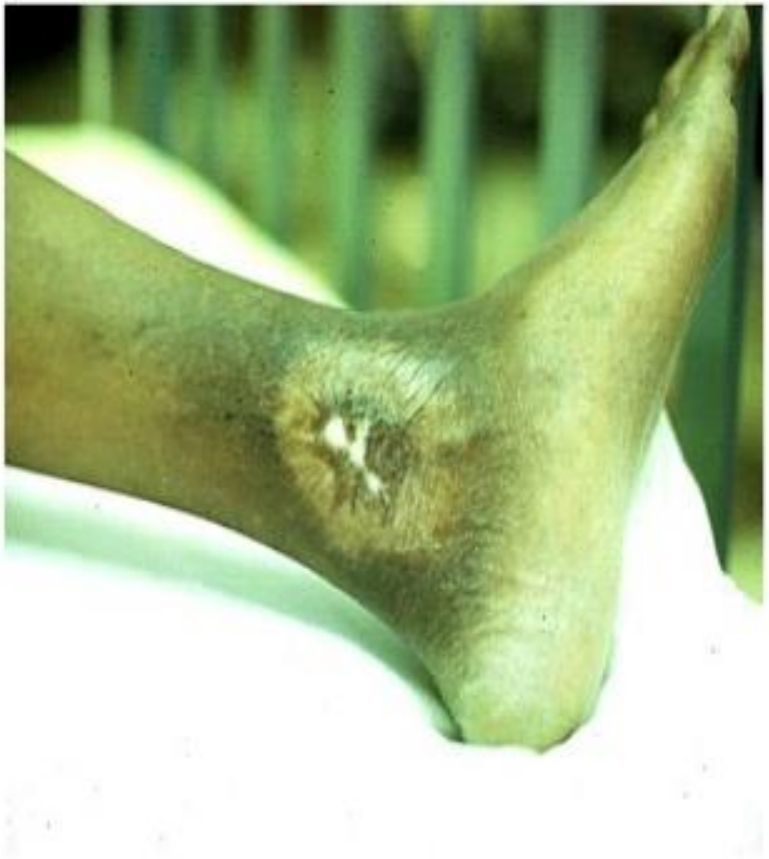


Cystic Fibrosis

GENTLE POUNDING ON THE CHEST, or chest percussion, has long been a standard treatment for cystic fibrosis. The procedure aims to clear mucus from clogged airways in the lungs. Investigators hope that growing understanding of the molecular basis of the disease will lead to drug therapies that prevent airway obstruction in the first place. The child here is being tapped by her mother. The white unit on her arm delivers intravenous antibiotics to combat infection of the lung.

Dwarfism

Sickle Cell Disease



F. Dominant Alleles

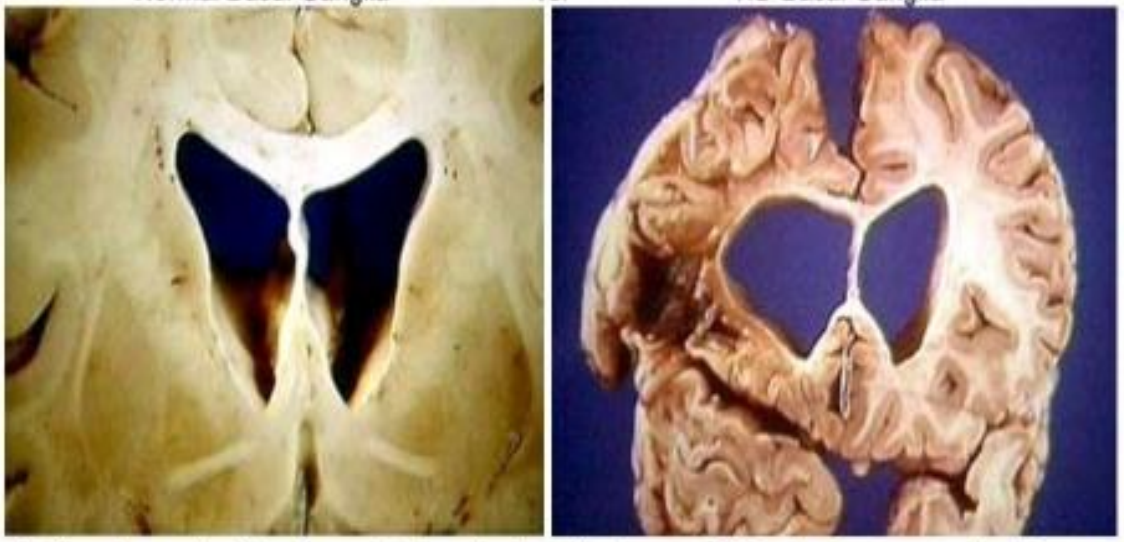
1. Not all genetic disorders are caused by a recessive allele.

2. Two examples of a genetic disorder caused by autosomal dominant alleles are dwarfism and Huntington's disease.

Huntington's disease

Figure D-4: Effect of HD on the Basal Ganglia

Normal Basal Ganglia vs. HD Basal Ganglia



The basal ganglia of the human brain, showing the impact of HD on brain structure in this region. Note especially that the brain of a person with HD has bigger openings due to the death of nerve cells in that region.

Source: Singer, Jonathan. Huntington's Disease. Online. Available at: http://ist-socrates.berkeley.edu/~jmp/HD.html

G. Codominant alleles

1. Sickle cell disease is caused by a codominant allele.

H. From Gene to molecule

1. In both cystic fibrosis and sickle cell disease, a small change in the DNA of a single gene affects the structure of a protein, causing a series genetic disorder.

2. CF is most common among people with Northern Europe ancestors.

II. Human Chromosomes

A. Human Genes and Chromosomes

1. Chromosomes 21 and 22 are the smallest human autosomes. Chromosome 22 contains 43 million DNA base pairs! Chromsomes 21 contains about 32 million!

2. MILLIONS of base pairs!

B. Sex Linked Genes

1. Many sex-linked genes are found on the X chromosomes. More than 100 sex-linked genetic disorders are found on the X.

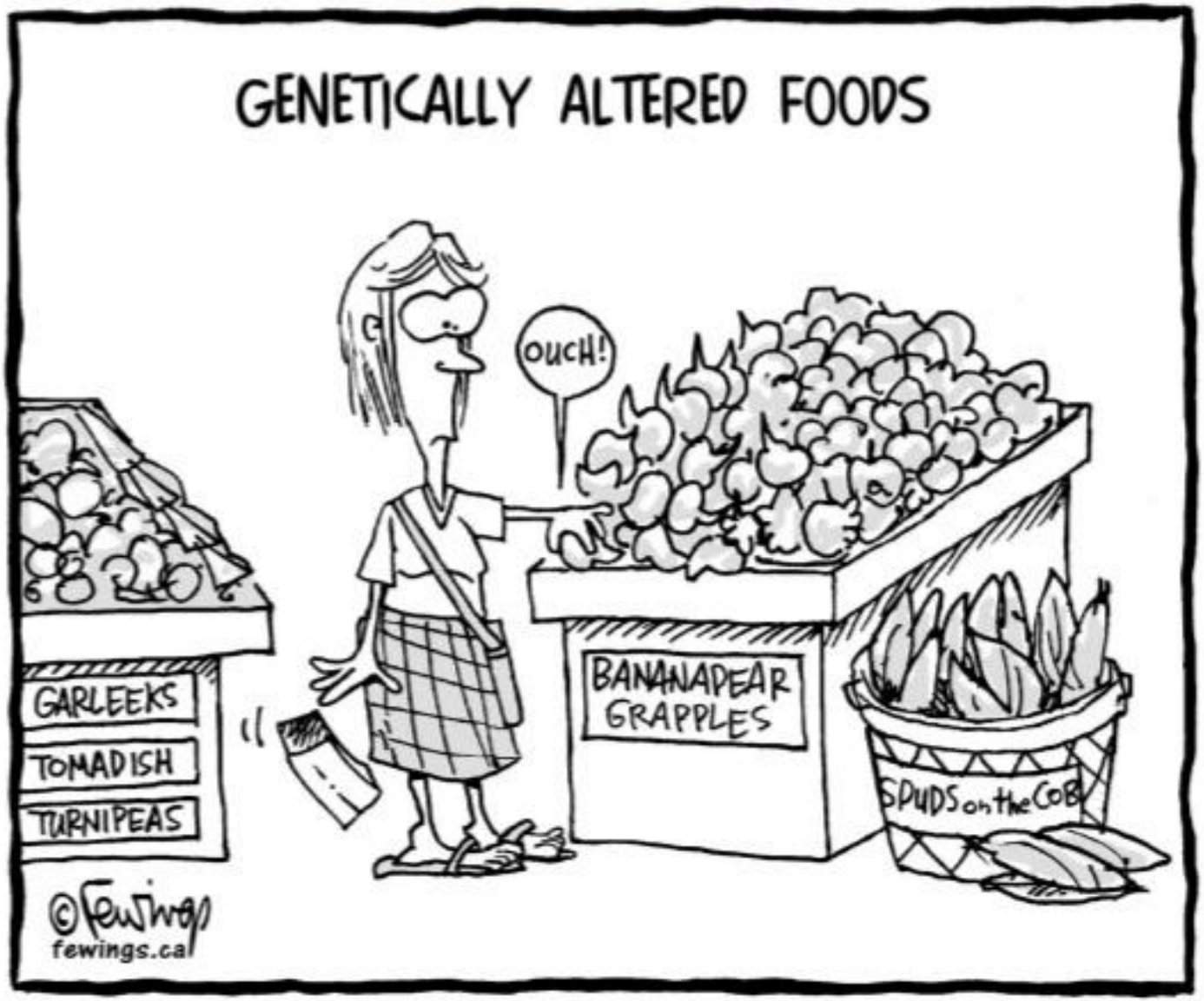
2. Males have just one X chromosome, thus all X-linked alleles are expressed in males even if they are recessive.

3. Some sex-linked disorders are colorblindness, hemophilia, and Duchenne muscular dystrophy.

Chromosomal disorders

- If two copies an autosomal chromosome fail to separate during meiosis, individual may be born with three copies os a chomosome. This is known as trisomy.

The END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