

Characteristics of Genetic Material:

Self-Replication

Information Storage

Stability

Variation through Mutation

Modern View of Gene:

Genes composed of nucleic acids

Information stored in nucleotide sequence (A,T,G,C)

Information used to assemble amino acids into proteins

Proteins perform variety of essential cellular functions

Alleles: Alternate versions of same gene

Differ in nucleotide sequence

Protein products differ in amino acid sequence

Sequence differences affect protein function

Mutation: Alters nucleotide sequence of gene

Central Dogma: DNA ---> RNA ---> Protein

Replication: DNA synthesis

Transcription: RNA synthesis

Translation: Protein synthesis

*Reverse Transcription: Utilized by RNA viruses
DNA made using RNA template*

Modern Age of Genomics

Organisms contain many genes that work together

Genome: Entire genetic content of organism

Genomics: Studies of genome structure and function

Genomes provide a detailed record of molecular evolution

*Genes from different organisms are related in sequence,
function, and origin*

*Genes examined in simple organisms can be used to
understand related genes in complex organisms*