

CYTOGENETICS

CYTOGENETICS

- Field of genetics involving microscopic examination of chromosomes
- Tightly compacted chromosomes have distinctive shapes and number
- Giemsa staining - Chemical dye gives a distinctive banding pattern
- Karyotype - produces imaging

THE BASICS OF GENETICS

CELLS AND CHROMOSOMES

- Every eukaryotic species has a characteristic number of chromosomes in each cell nucleus
- Somatic cells = non-reproductive
 - have two sets of chromosomes
 - $2n = 46$ - pancreas cells, muscle cells, etc...
- Gametes = reproductive cells: sperm and eggs
 - have half as many chromosomes as somatic cells
 - $n=23$
- Eukaryotic chromosomes consist of chromatin
- Chromatin - a complex of DNA and protein that condenses during cell division

CELLULAR ORGANIZATION OF THE GENETIC MATERIAL

- Most cell division results in daughter cells with identical genetic information, DNA
- Non-identical daughter cells = gametes: sperm/egg cells
- All the DNA in a cell constitutes the cell's genome
- A genome:
 - = a single DNA molecule
 - (common in prokaryotic cells)
 - = a number of DNA molecules
 - (common in eukaryotic cells)
- DNA molecules in a cell are packaged into chromosomes

DISTRIBUTION OF CHROMOSOMES DURING EUKARYOTIC CELL DIVISION

In preparation for cell division:

- DNA = replicated, chromosomes = condense
- Each duplicated including DNA chromosome has two sister chromatids, which separate during cell division

Centromere

- narrow "waist" of the duplicated chromosome
- where the two chromatids are most closely attached
- not visible

Chromosome

- Contains the genetic material (DNA)
- Contains proteins
- "packed" within cell's nucleus

TELOMERES:

telomerase, cell senescence, cancer, & pre-mature aging

- repetitive sequences of non-coding DNA (genome.gov)
- TTAGGG (THYMININE, THYMININE ADENINE GUANINE, GUANINE, GUANINE)
- specific DNA-protein structures found at both ends of each chromosome protecting a genome from nucleolytic degradation, unnecessary recombination, repair, and intrachromosomal fusion
- Located at the both tip of the chromosome

TELOMERES AND CELLULAR SENESCENCE

normal, dividing cell

- approximately 30 to 50 times without apoptosis involved

repeated cell replication and division is possible

- DNA sequence loss
- cell replication stopped

When young mas makapal pa yung telomerase kasi habangtumatanda mas numinipis kasi sa DNA replication.

- Neurons does not divide
- Stratified tissues are fast in cell division.

REPLICATION AND TELOMERES

- Once the telomeres is absent form a chromosome the person maybe prone to cancer mutations.

Telomerase- enzyme

Text Of Cytogenetics

Jin-Ying Zhang



Text Of Cytogenetics:

Text Of Cytogenetics Book Review: Unveiling the Power of Words

In some sort of driven by information and connectivity, the power of words has be much more evident than ever. They have the capacity to inspire, provoke, and ignite change. Such may be the essence of the book **Text Of Cytogenetics**, a literary masterpiece that delves deep to the significance of words and their affect our lives. Written by a renowned author, this captivating work takes readers on a transformative journey, unraveling the secrets and potential behind every word. In this review, we shall explore the book is key themes, examine its writing style, and analyze its overall affect readers.

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Text Of Cytogenetics Introduction

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