Universidade de São Paulo
Escola de Engenharia de Lorena
Departamento de Biotecnologia

Curso: Engenharia Ambiental

Núcleo e Material Genético

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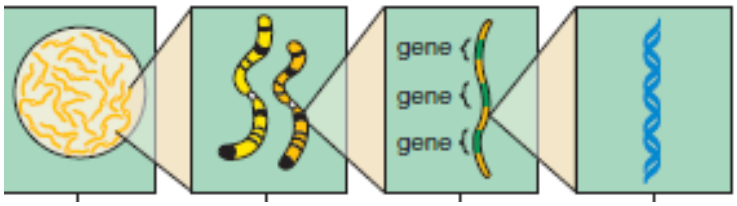
Material Genético

✓Genoma : Conjunto de Cromossomos

✓ Cada Cromossomo: contém 1 molécula de DNA+ proteínas



Genoma **Cromossomos** **DNA**

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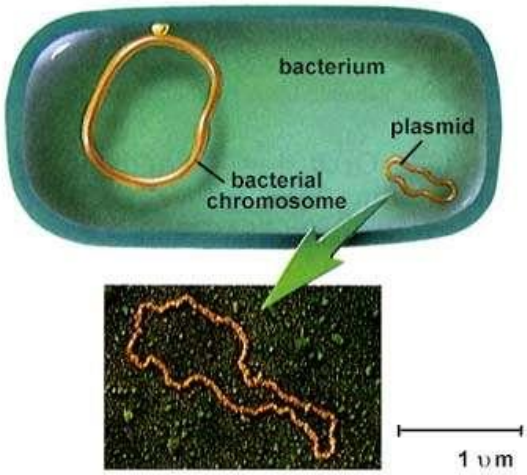
Procariotos

✓Material Genético: 1 Cromossomo e Plasmídeos



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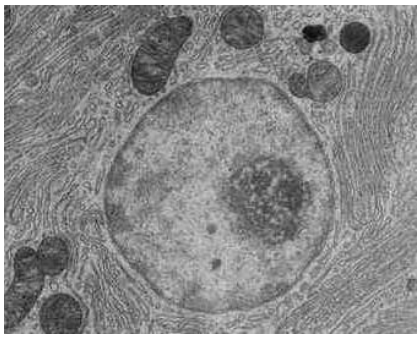
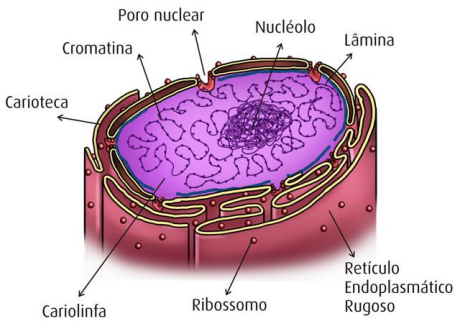
Eucarioto – Núcleo



Núcleo = Centro

~ 6 µm de diâmetro

10% do volume celular



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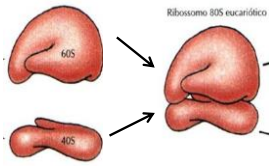
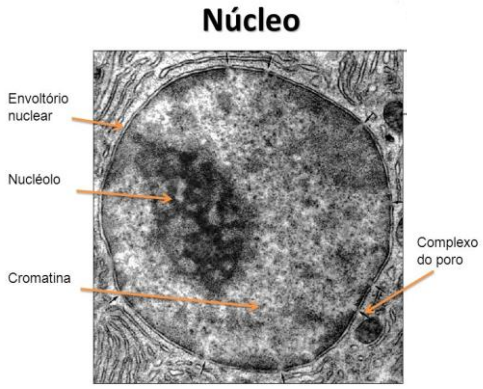
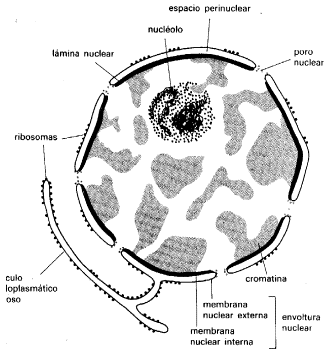
Nucléolo

- ❖ Denso e não membranoso
- ❖ Rico em proteínas e RNA Ribossomal







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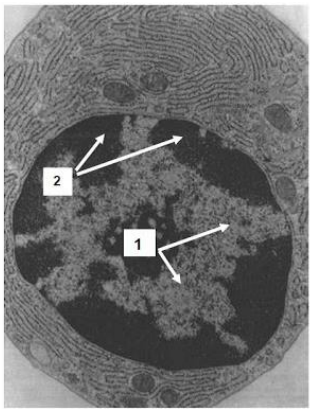
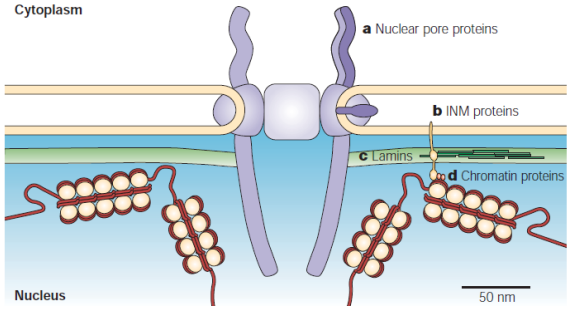
Cromatina

- ✓Cromatina = DNA + proteínas
- ✓ Compactação do DNA





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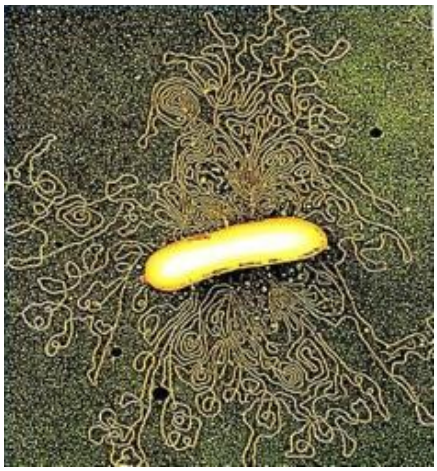
Necessidade de Compactar o DNA

✓ Em Procarioto e Eucarioto



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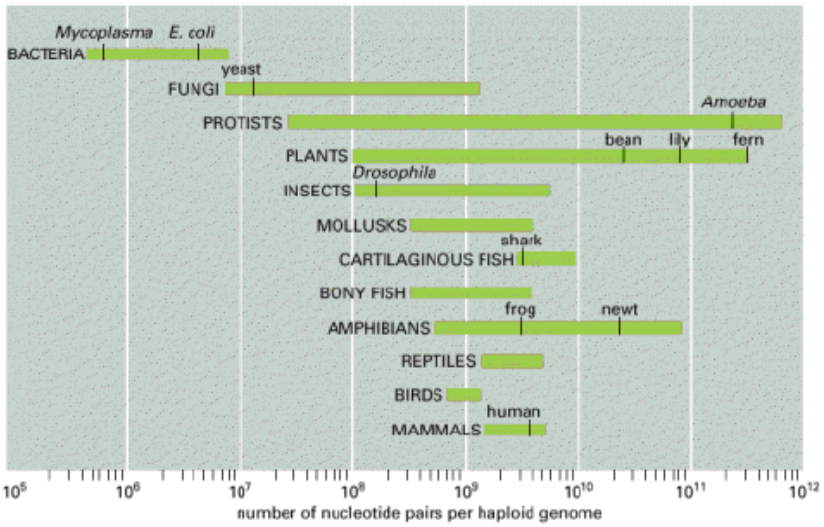
Tamamho do Genoma X Complexidade do Organismo



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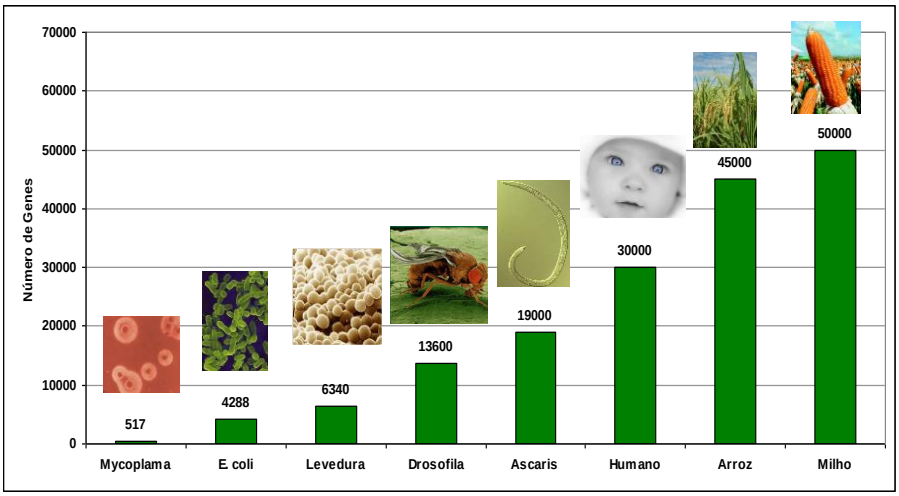
Número de Genes



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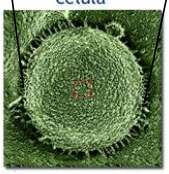
Desafio do empacotamento do DNA

✓ Eucariotos: Genoma grandes (Ex: Humano ~2m) dentro do núcleo de 6 µm .

~ 40 km

DNA ~ 2m

O núcleo da célula



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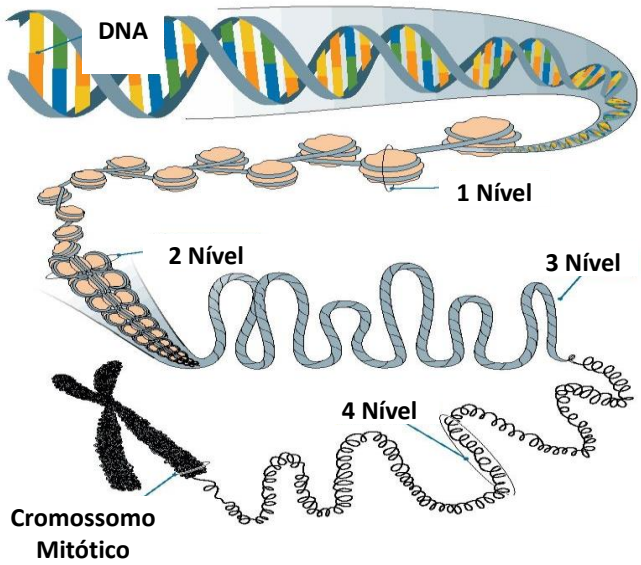
Cromossomo Eucarioto: Níveis de Compactação do DNA



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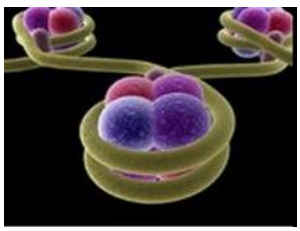
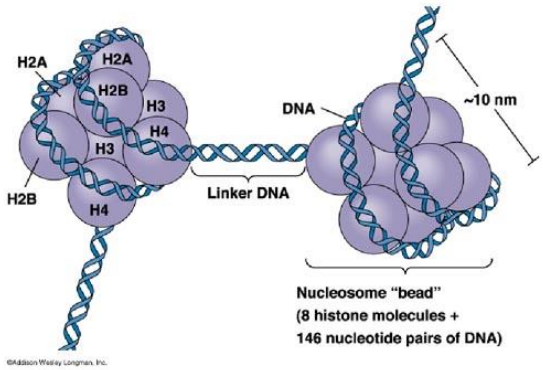
1º Nível : Nucleossomo

✓Associação do DNA com proteínas Histonas

✓ Octâmero Histonas: dois tetrâmeros de H2A, H2B, H3 e H4.





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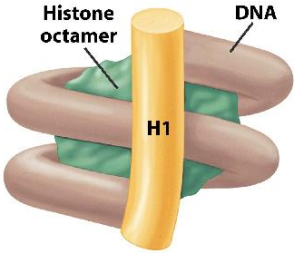
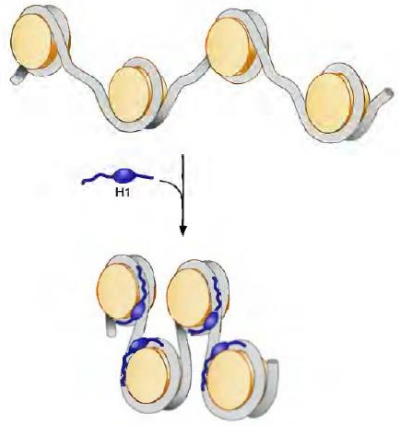
1º Nível : Nucleossomo

✓Entrada da Histona H1





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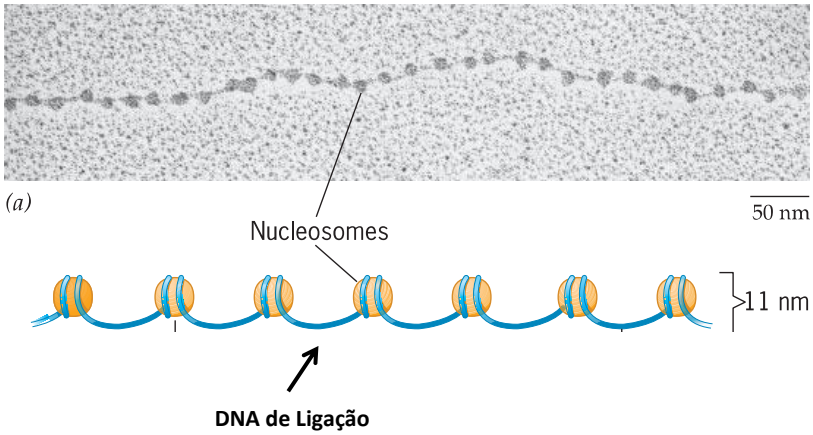
1º Nível : Nucleossomo

✓Estrutura de " cordão de contas"



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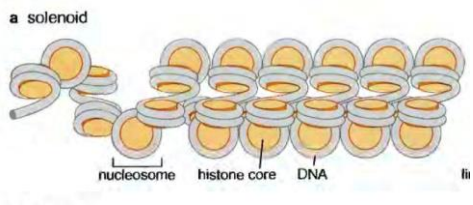
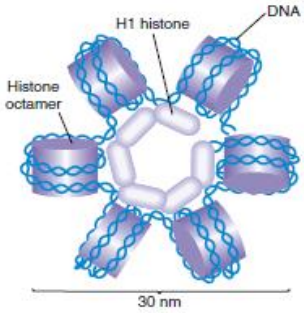
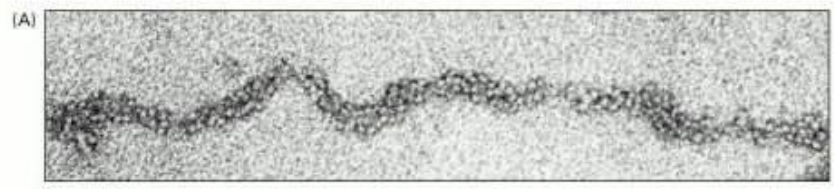
2º Nível : Solenóide

✓6 nucleossomos por volta







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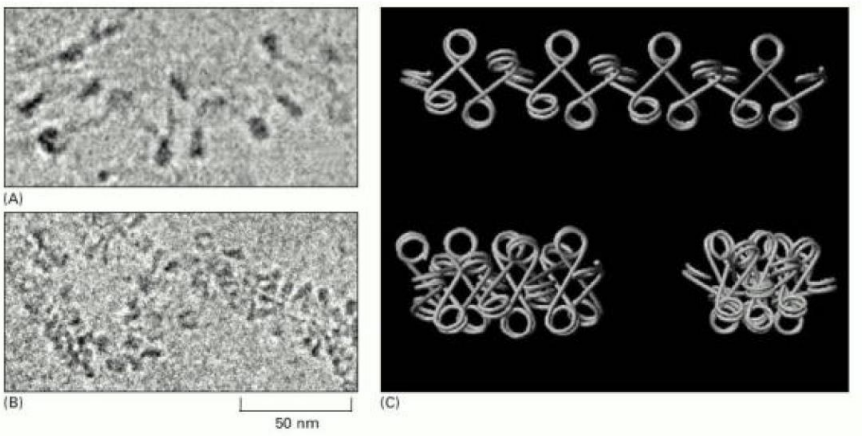

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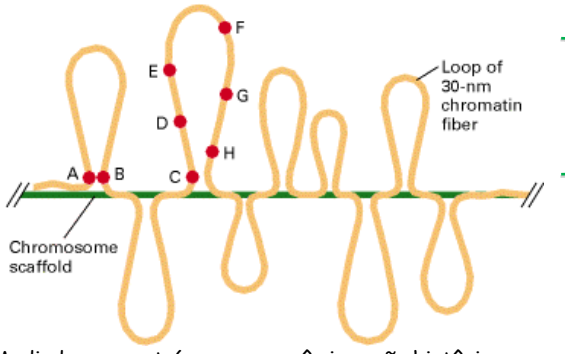
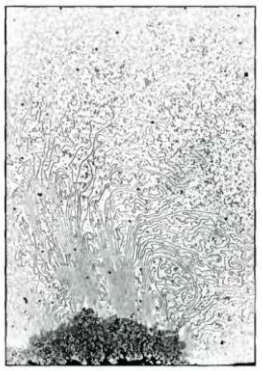
3º Nível : Arcabouço



300 nm



Mediado por proteínas cromossômicas não histônicas

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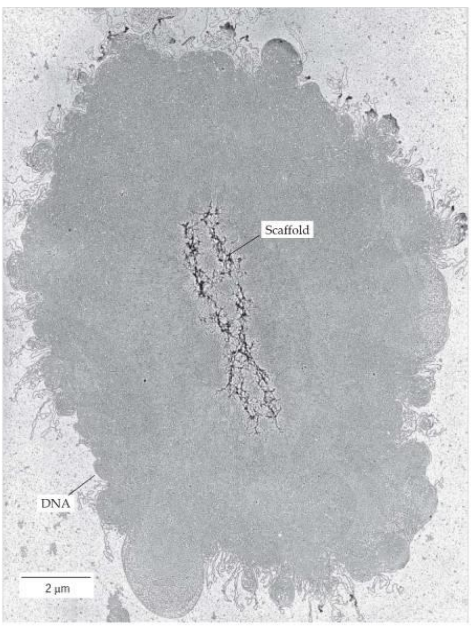
✓DNA sem histonas



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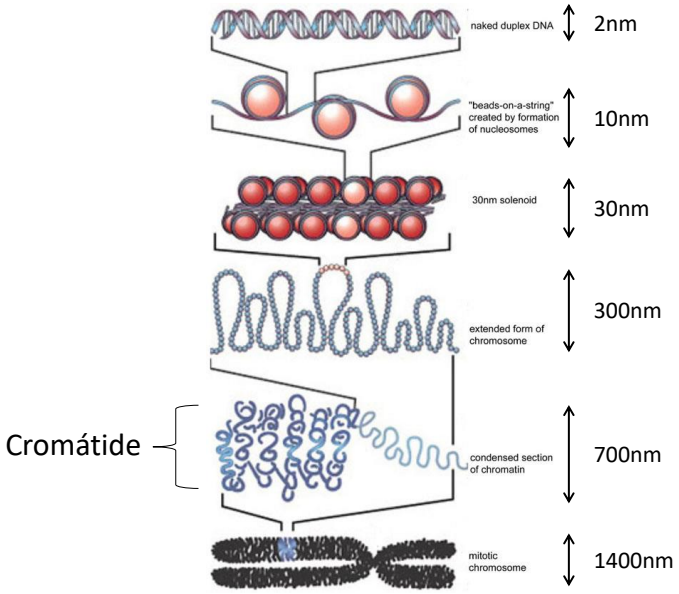
4º Nível - Cromátide



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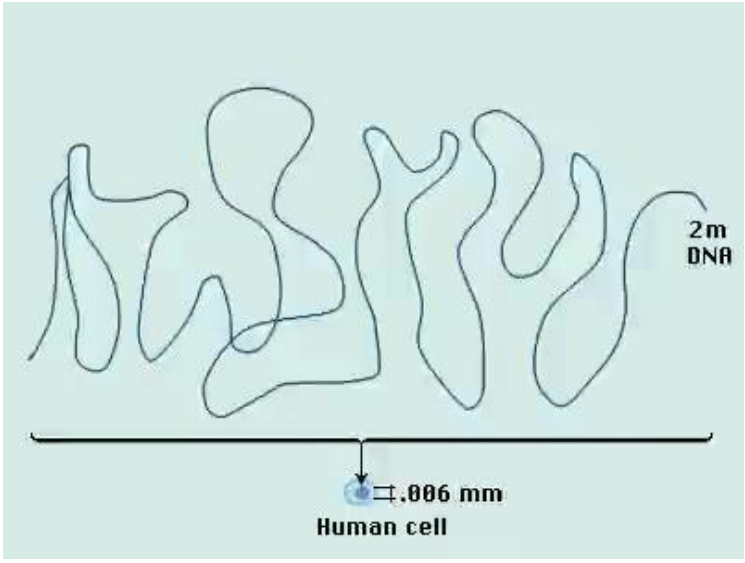

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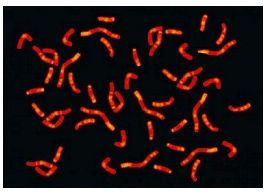
Cromossomo mitótico

✓ Maior nível de Compactação do DNA

✓Cromossomo duplicado – Cromátides homólogas

Cromossomos não duplicados



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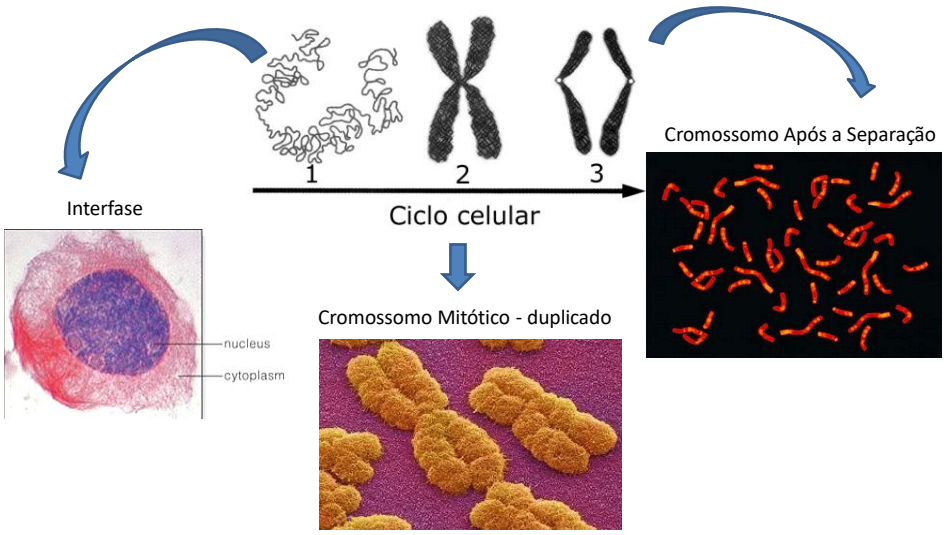
Topologia do Cromossomo Eucarioto

✓Diferenças morfológicas ao longo do ciclo celular



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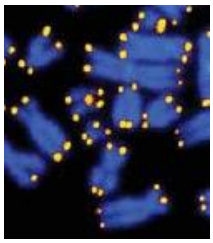
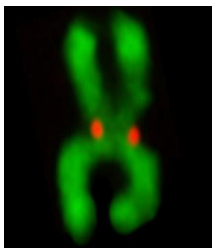
Estrutura geral dos Cromossomos Mitóticos

✓Centrômero: mantém as cromátides

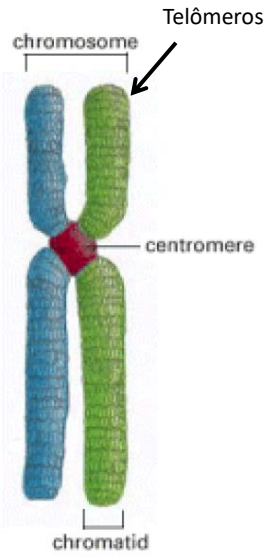
✓ Telômeros: proteção das extremidades



Telômeros



Centrômero



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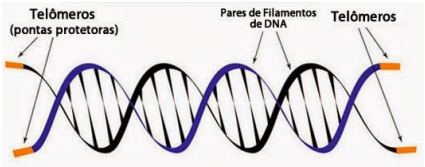

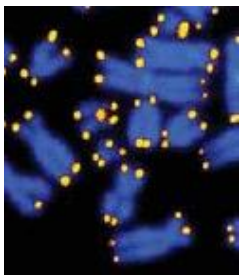

The Nobel Prize in Physiology or Medicine 2009

Elizabeth H. Blackburn, Carol W. Greider, Jack W. Szostak

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The Nobel Prize in Physiology or Medicine 2009

Photo: U. Montan

Elizabeth H. Blackburn

Prize share: 1/3

Photo: U. Montan

Carol W. Greider

Prize share: 1/3

Photo: U. Montan

Jack W. Szostak

Prize share: 1/3

The Nobel Prize in Physiology or Medicine 2009 was awarded jointly to Elizabeth H. Blackburn, Carol W. Greider and Jack W. Szostak *"for the discovery of how chromosomes are protected by telomeres and the enzyme telomerase"*.

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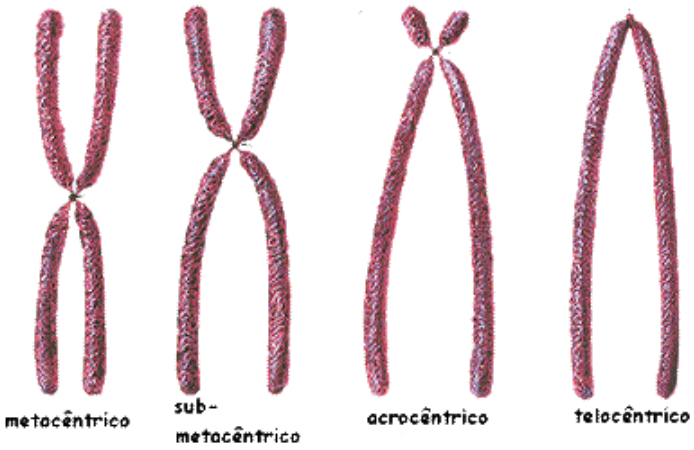
Tipos de Cromossomos



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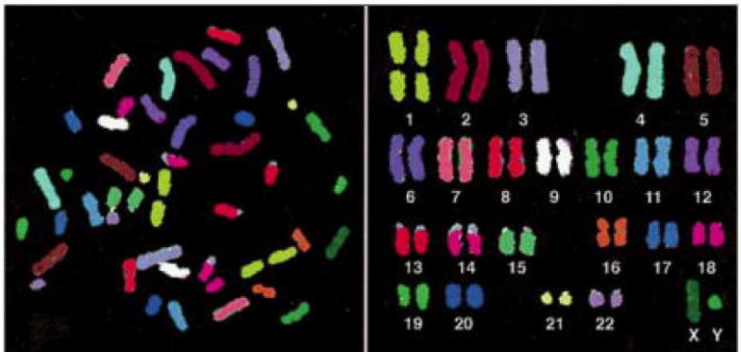
DNA Eucarioto

✓Cópias do mesmo tipo de cromossomo (Homólogos)

Ex: Homem – diploide (22 pares, 2 sexuais)

Cariótipo – Humano (Hibridização de Fish)



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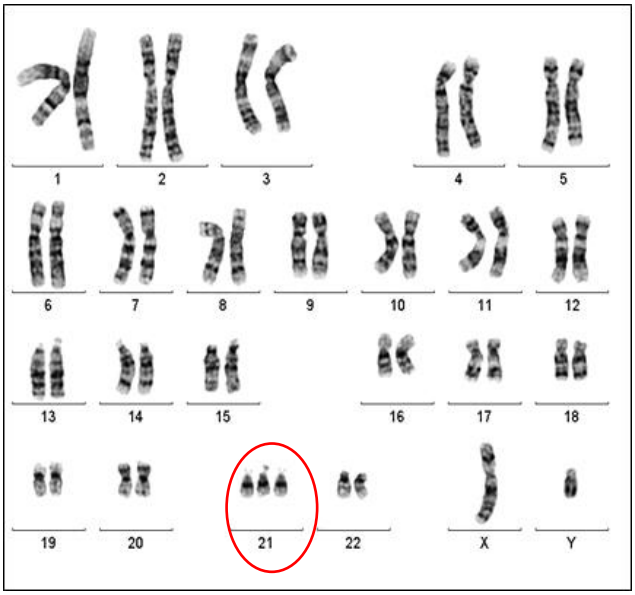
DNA Eucarioto

✓ Ex: Trissomia do 21



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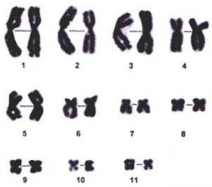
Cariótipo em Diferentes espécies

❖ **Sapo**

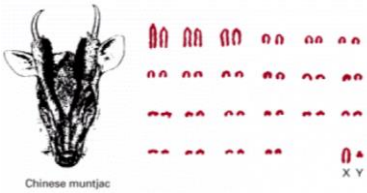


11 pares

❖ **Diferentes espécies de Grilo**

7 pares, 2 sexuais

❖ **Diferentes espécies de Cervo**



22 pares, 2 sexuais

2 pares, 2 sexuais

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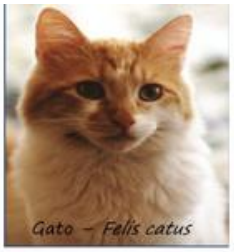
Cariótipo em Diferentes espécies

Todas estas espécies possuem no seu cariótipo 38 cromossomos



Tigre – *Panthera tigris*

Chita ou leopardo caçador – *Acinonux iubatus*

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