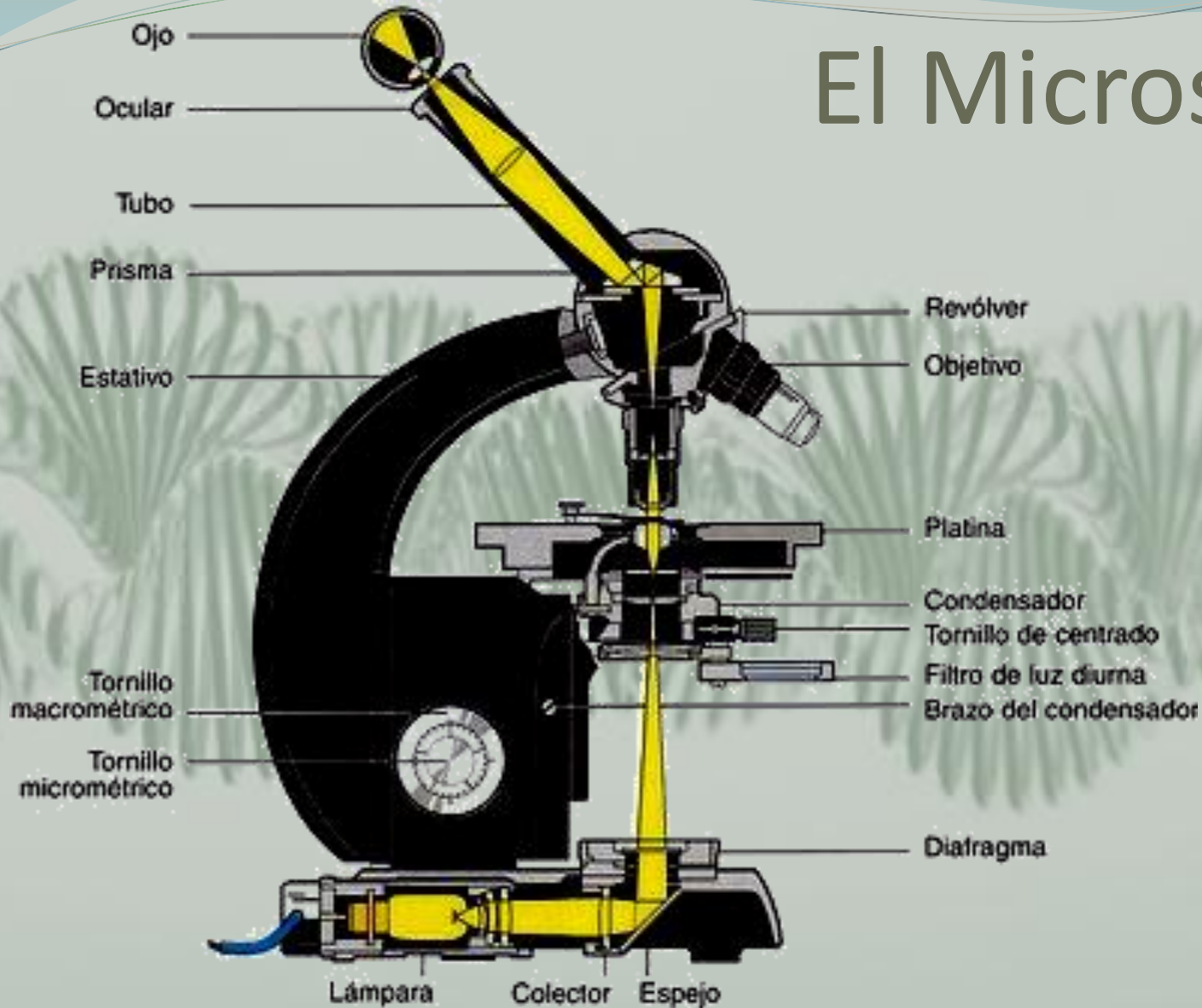


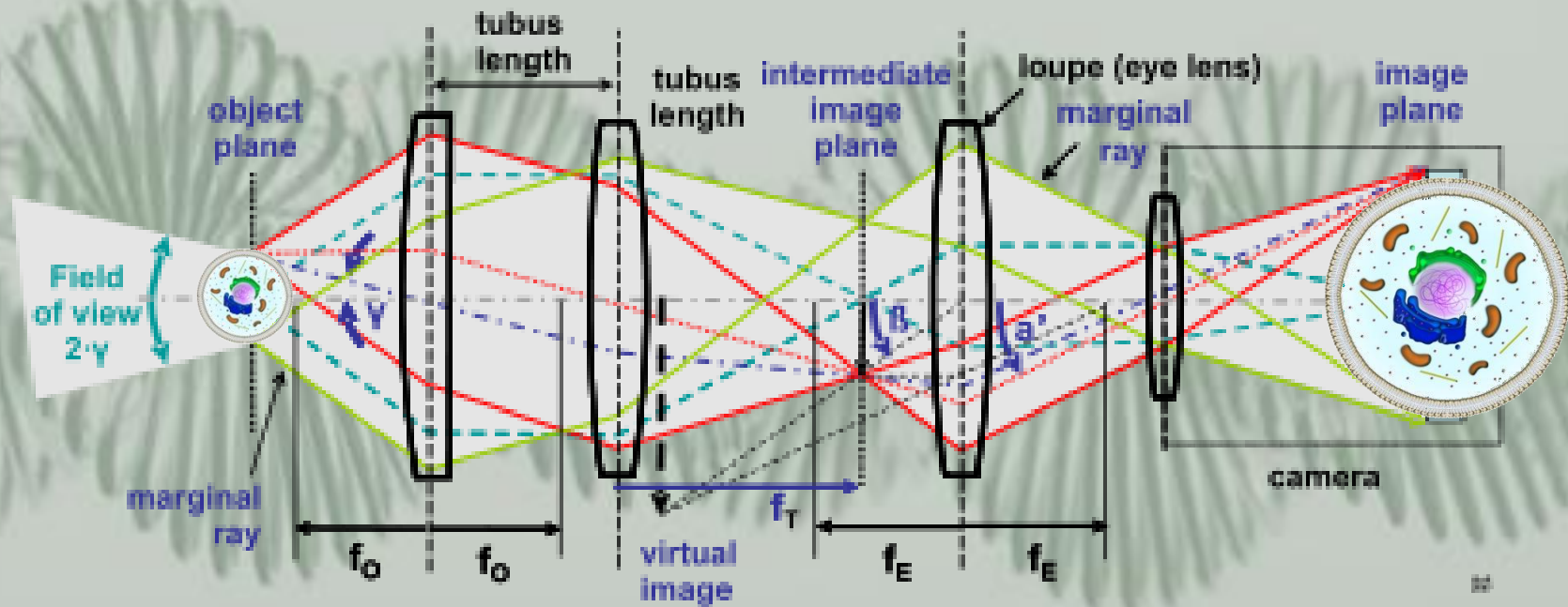


LA MAQUINARIA MOLECULAR II

Prof. Ricardo Silva, PH.D., C.C.E.

El Microscopio





Contraste de Fase

Shade-Off in Positive and Negative Phase Contrast

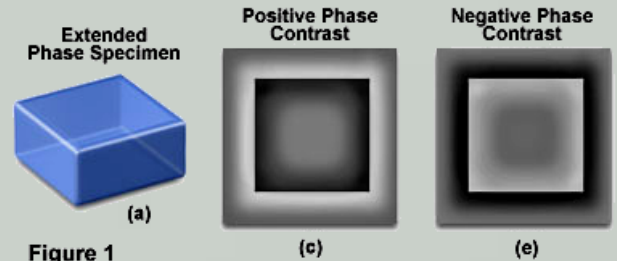
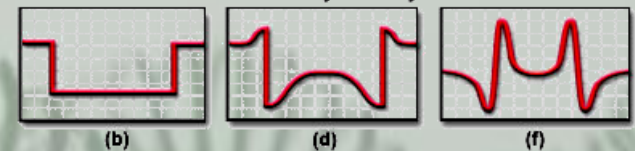
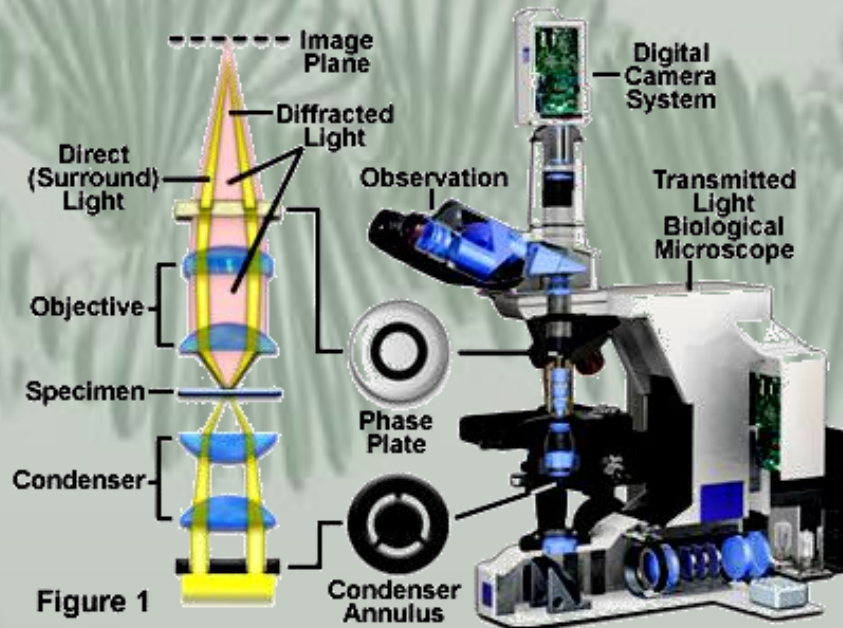


Figure 1

Microdensitometry Intensity Profiles



Phase Contrast Microscope Configuration



Halos in Phase Contrast and DIC Microscopy

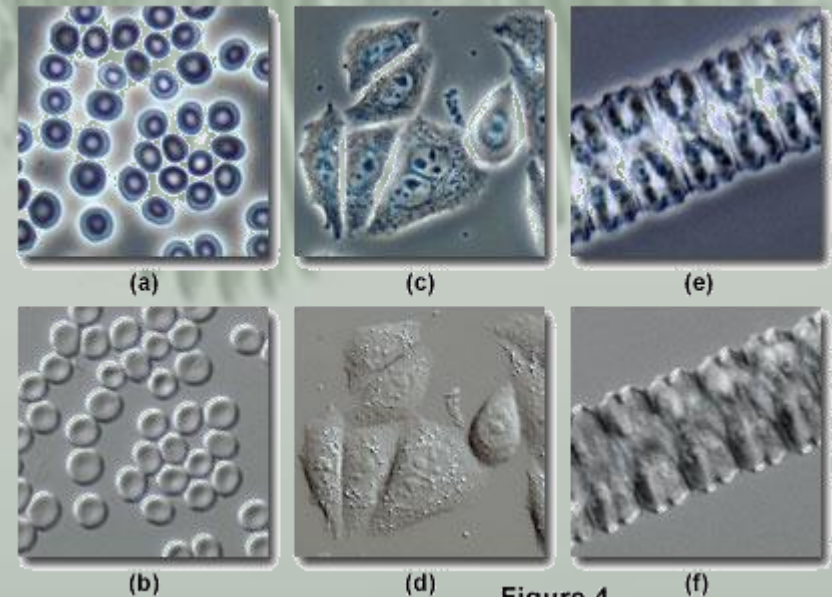
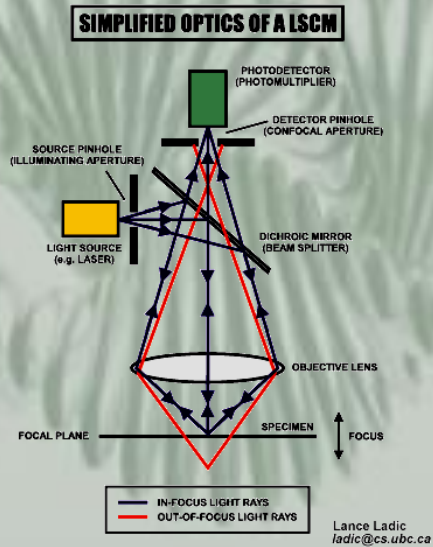


Figure 4

Microscopía Confocal y Fluorescencia



Modern Microscope Component Configuration

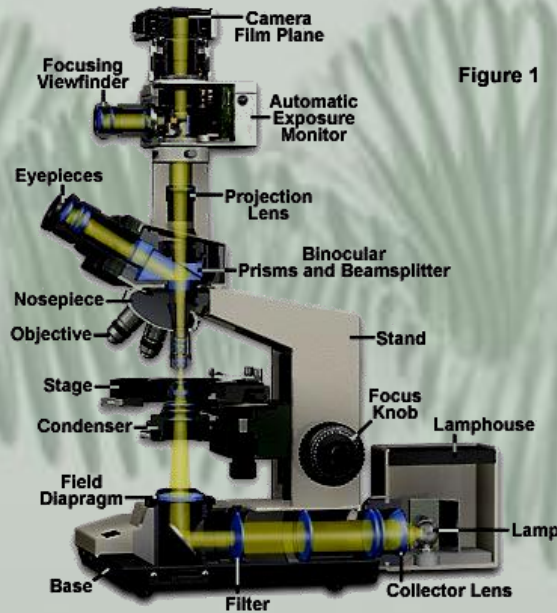
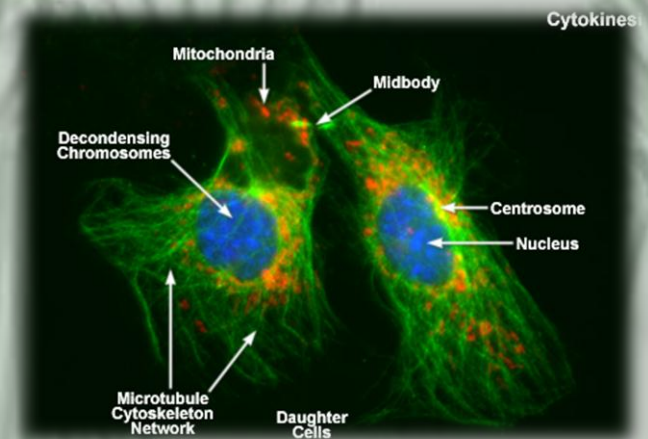


Figure 1



Fluorescencia

Stokes' Observation

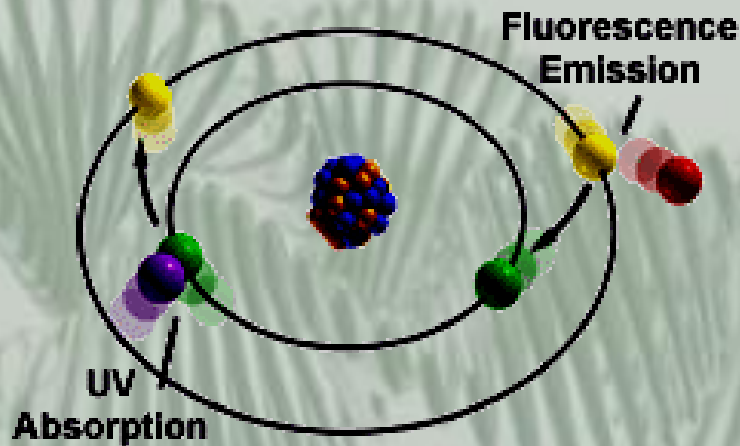


Figure 1

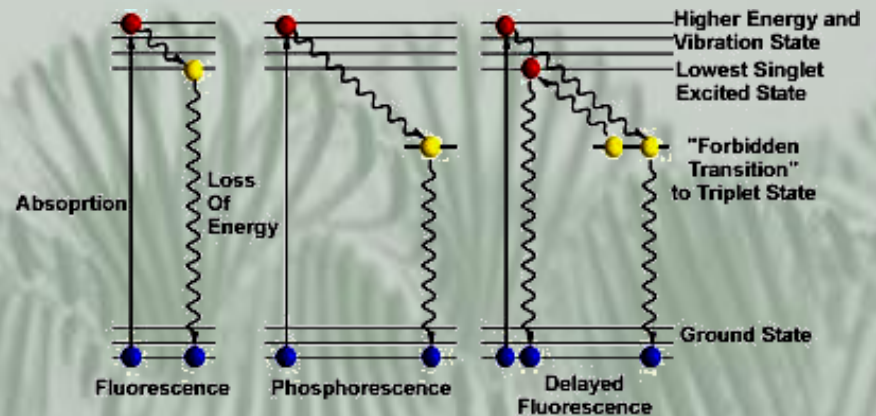
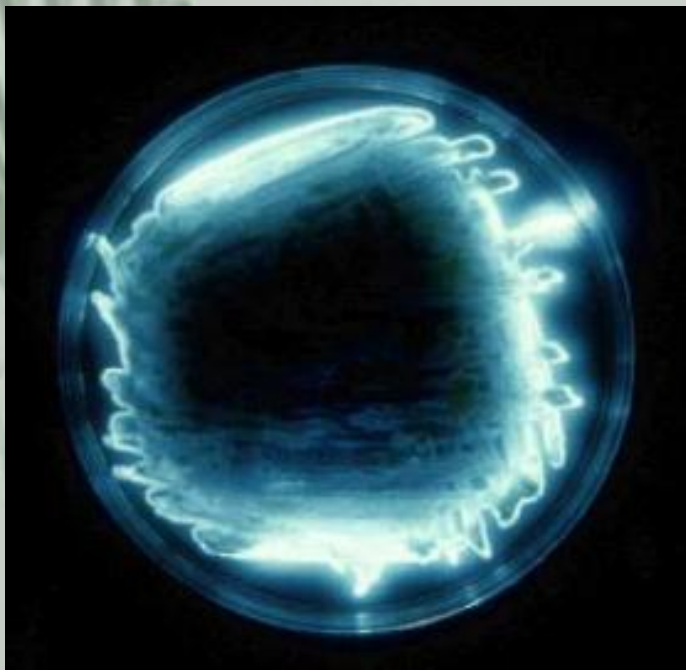


Figure 4

$$E = h\nu = hc/\lambda$$

<http://micro.magnet.fsu.edu/primer/java/exciteemit/index.html>

Luciferina



Tipo de luciferina	Organismos que la presentan	Molécula
Bacterial	Bacterias Algunos peces Algunos calamares	<chem>Cc1ccc2c(c1)c(=O)[nH]c2N(C)C(CO)COP(=O)([O-])[O-]</chem>
Dinoflagelada	Dinoflagelados Crustáceos eufasiaceos (zooplankton)	<chem>Cc1c(C)nc(C)nc1C(=O)O[Na]C(C)C(=O)O[Na]</chem>
Vargula	Ostrácodos Algunos peces	<chem>Cc1c(C)nc(C)nc1C(=O)O[Na]C(C)C(=O)O[Na]</chem>
Coelenterazina	Radiolarios Ctenóforos Cnidarios Calamares Copépodos Decápodos Micidaceos Algunos peces Quetognatos	<chem>Cc1c(C)nc(C)nc1C(=O)O[Na]C(C)C(=O)O[Na]</chem>
Luciémaga	Luciémagas (coleópteros)	<chem>Cc1c(C)nc(C)nc1C(=O)O[Na]C(C)C(=O)O[Na]</chem>

Microscopía por Fluorescencia

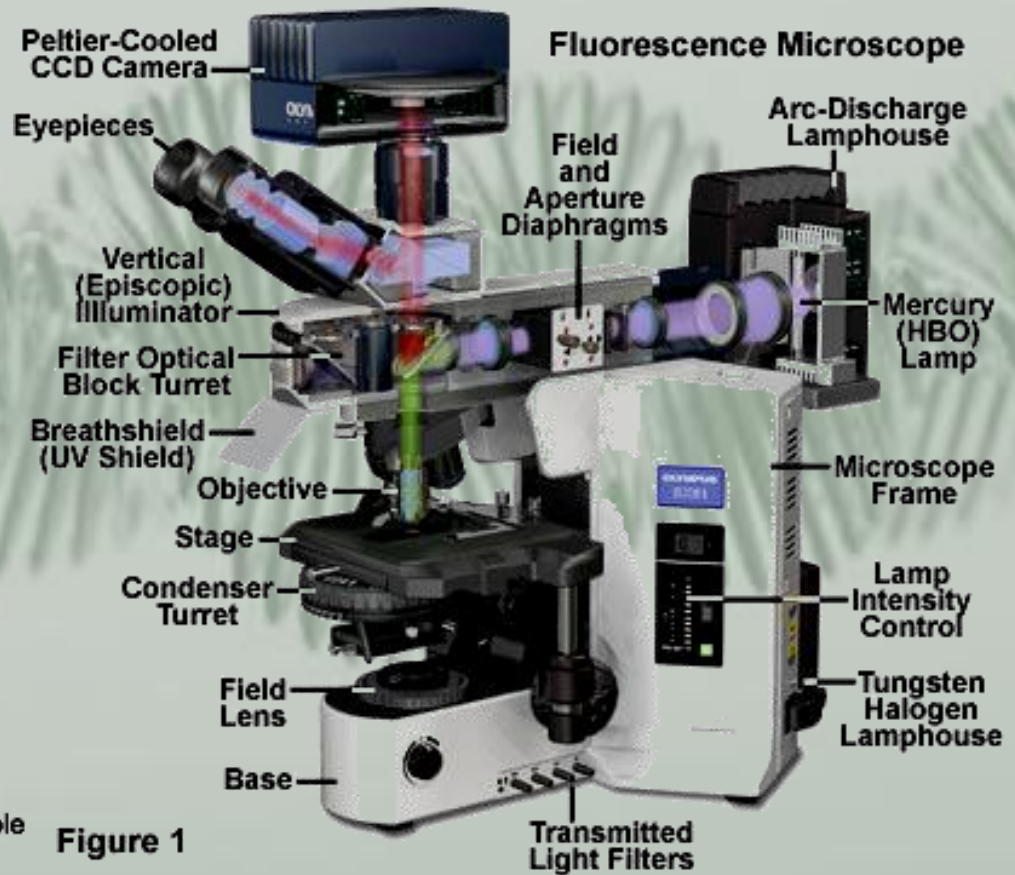
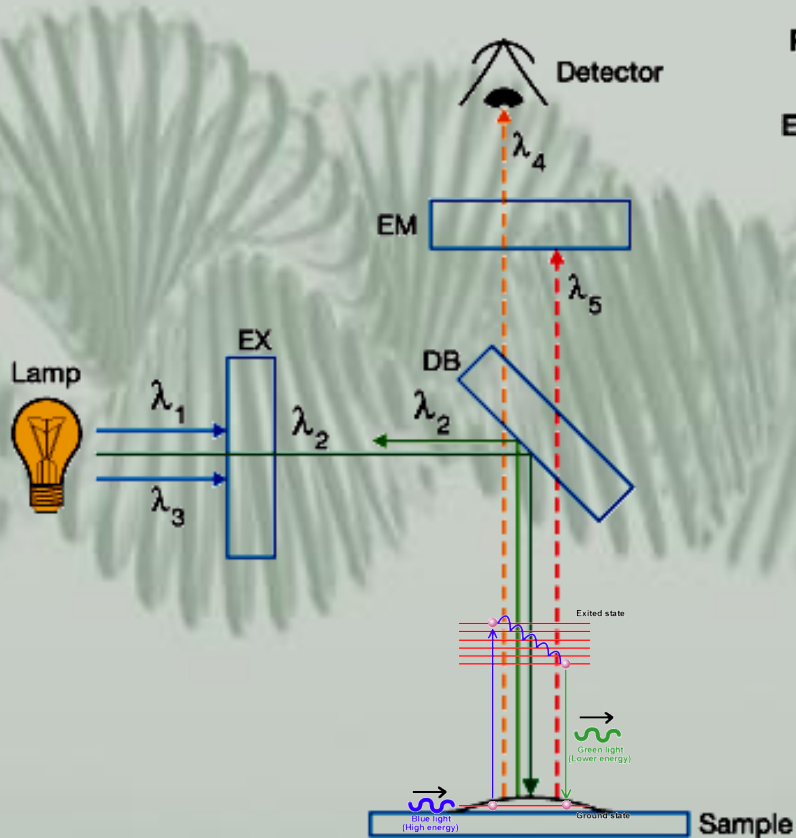
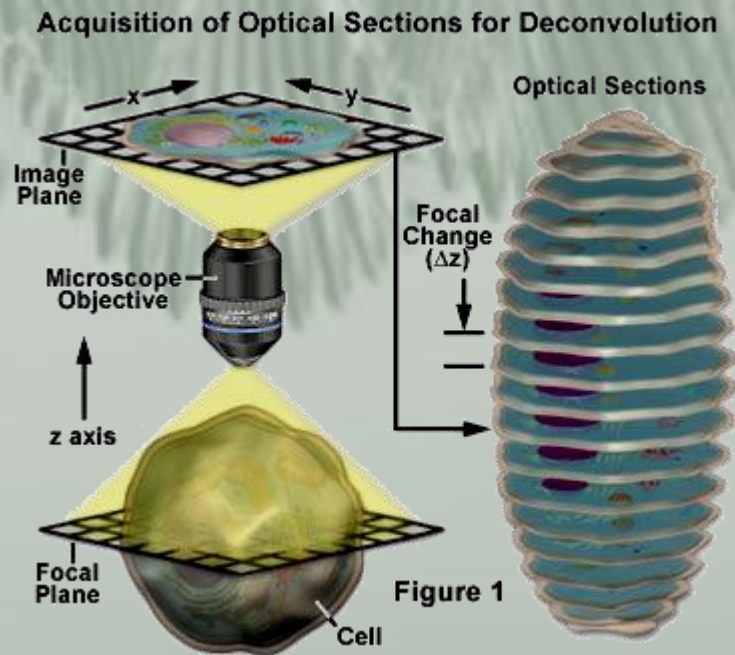
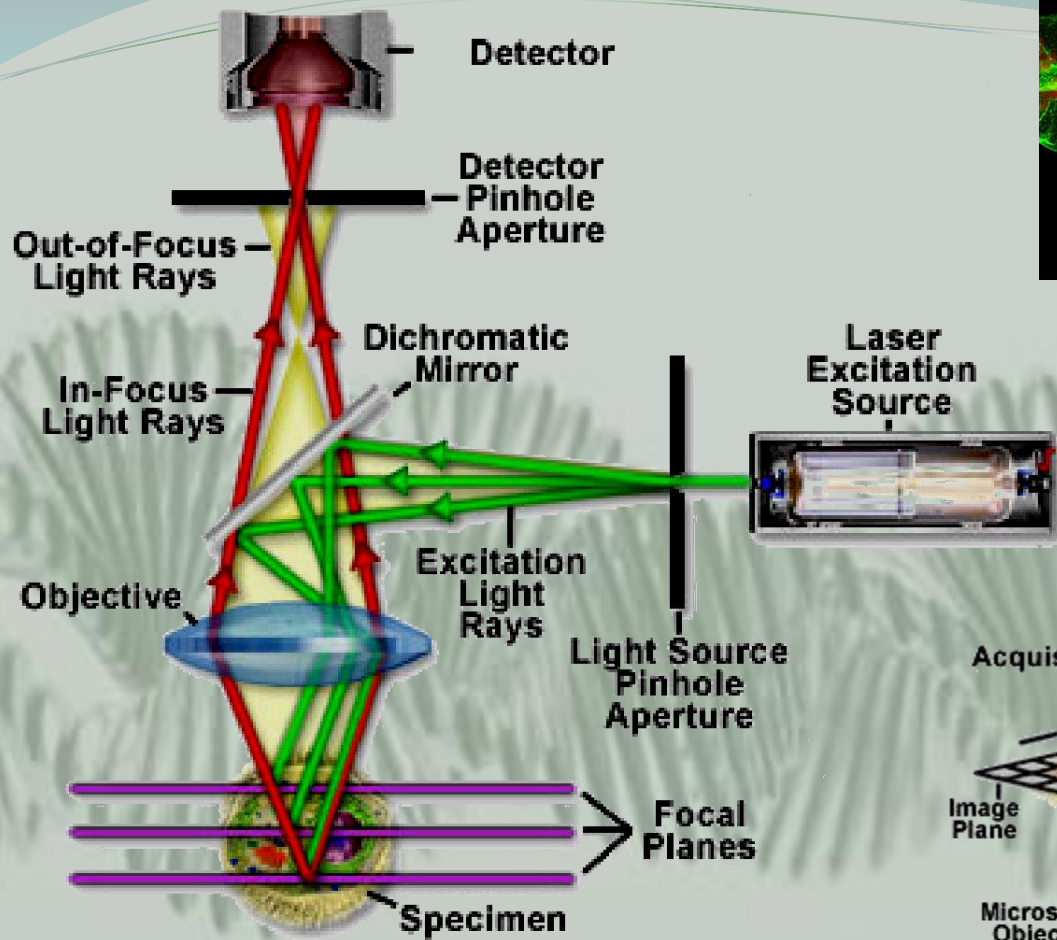
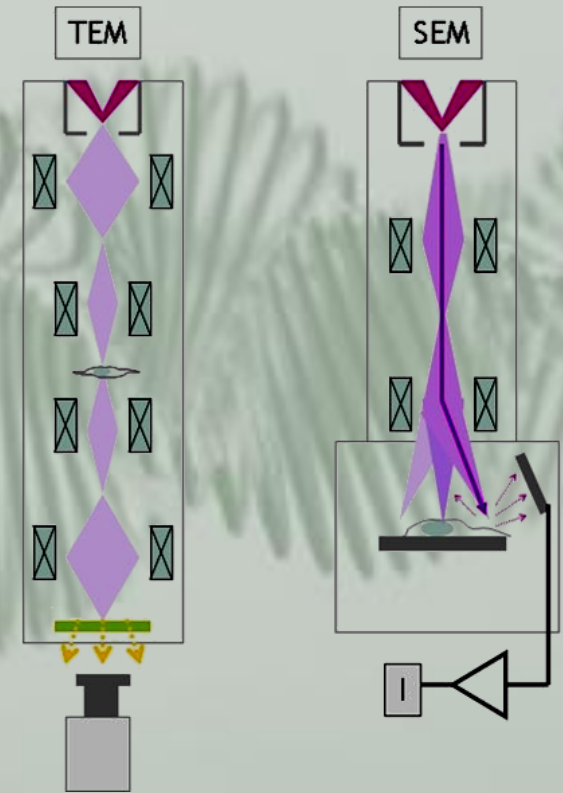
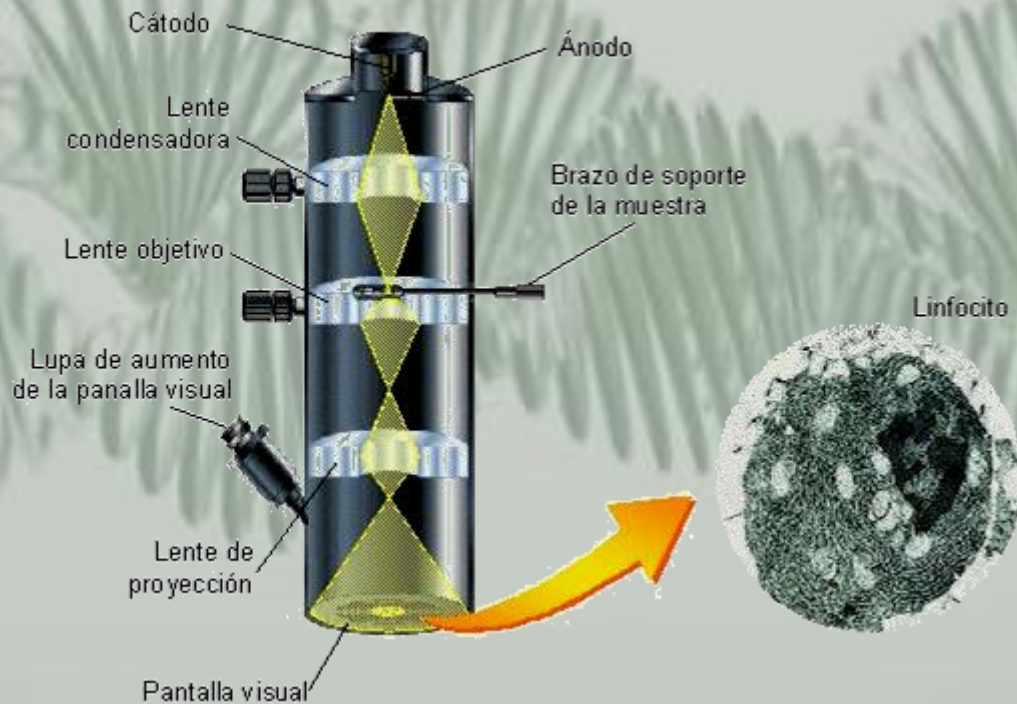


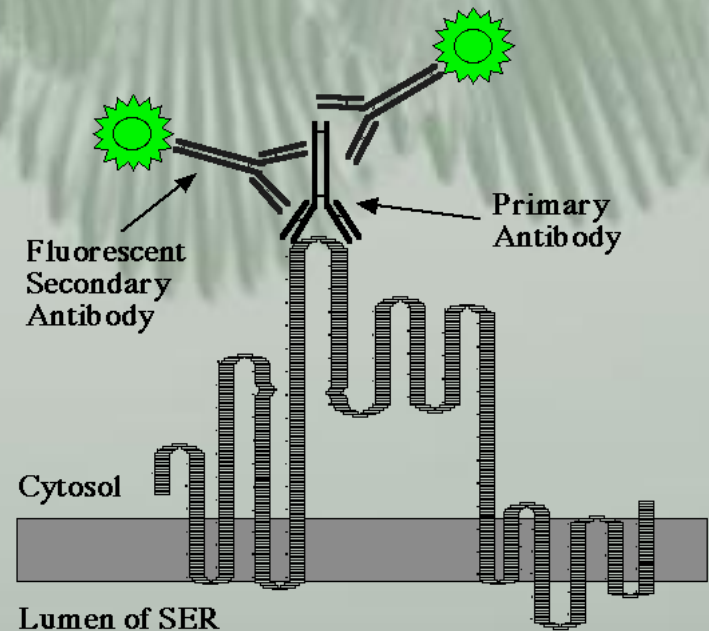
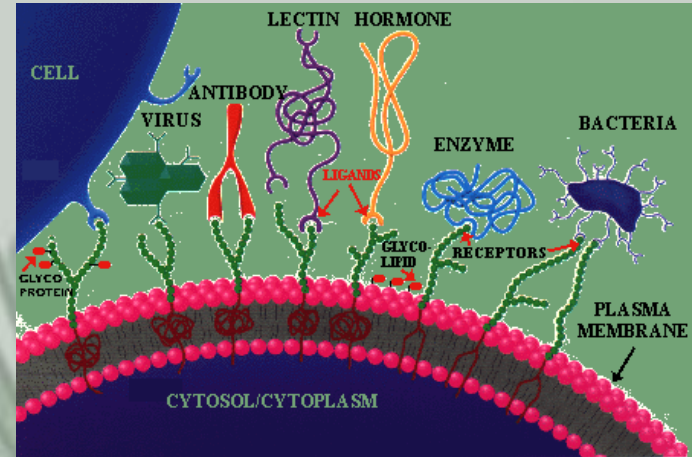
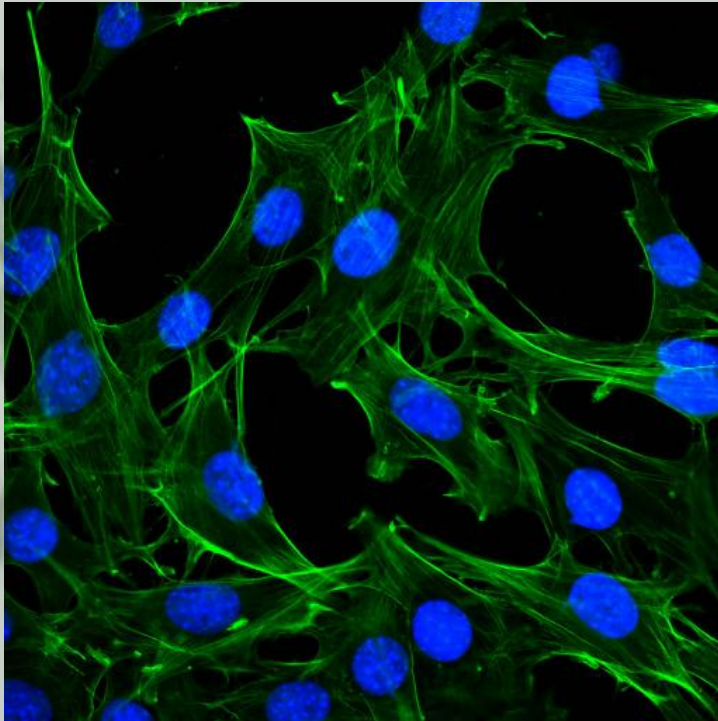
Figure 1



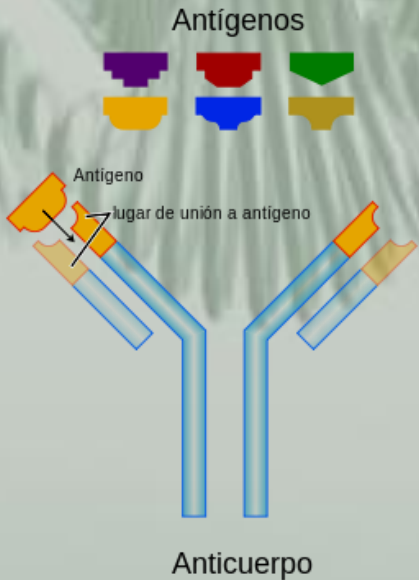
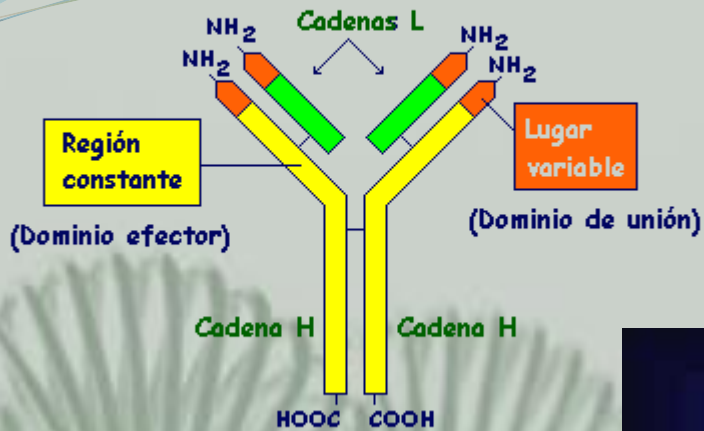
Microscopio Electrónico



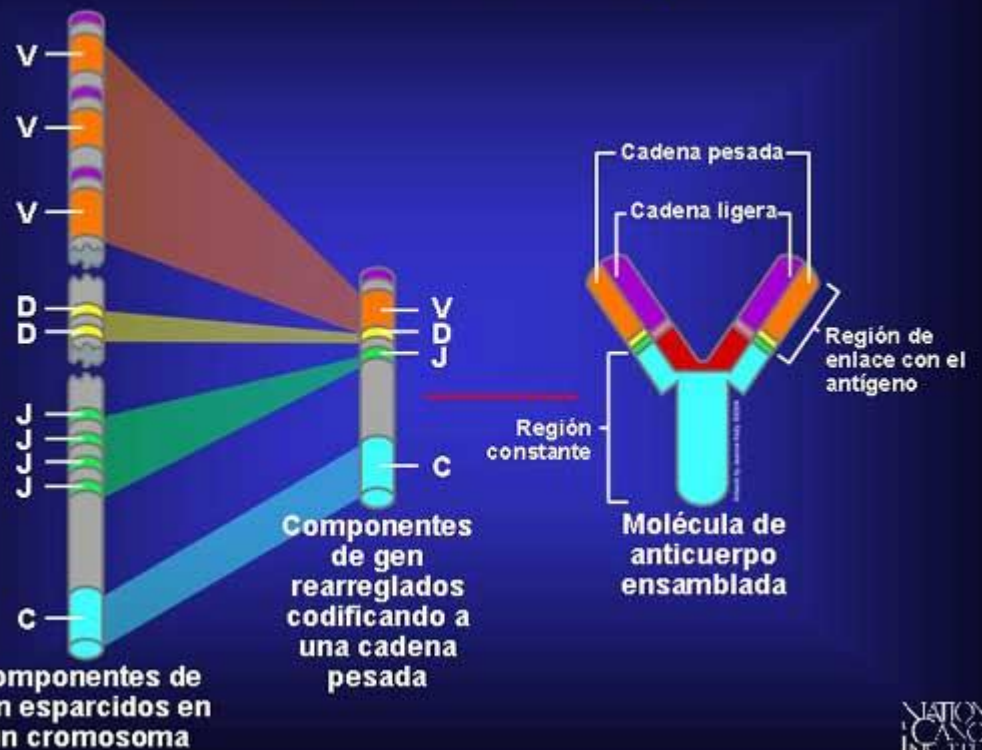
Inmunofluorescencia

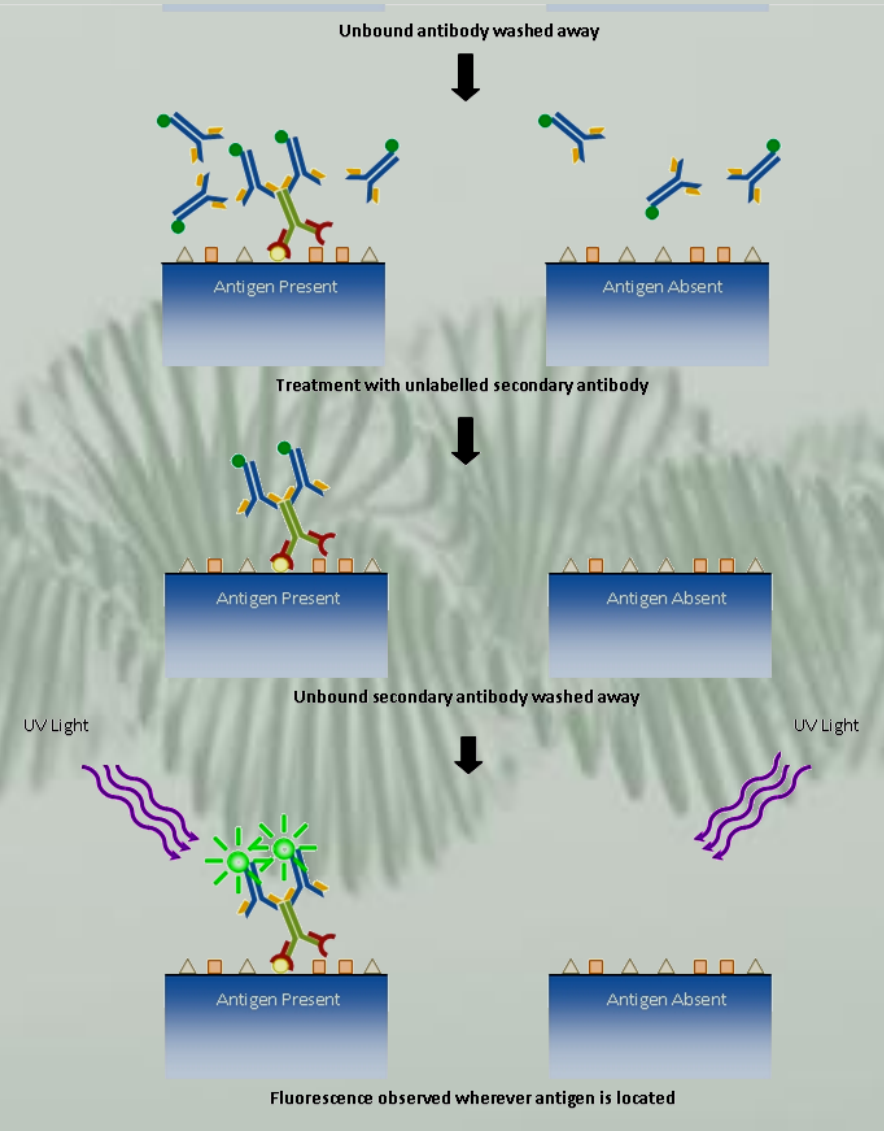
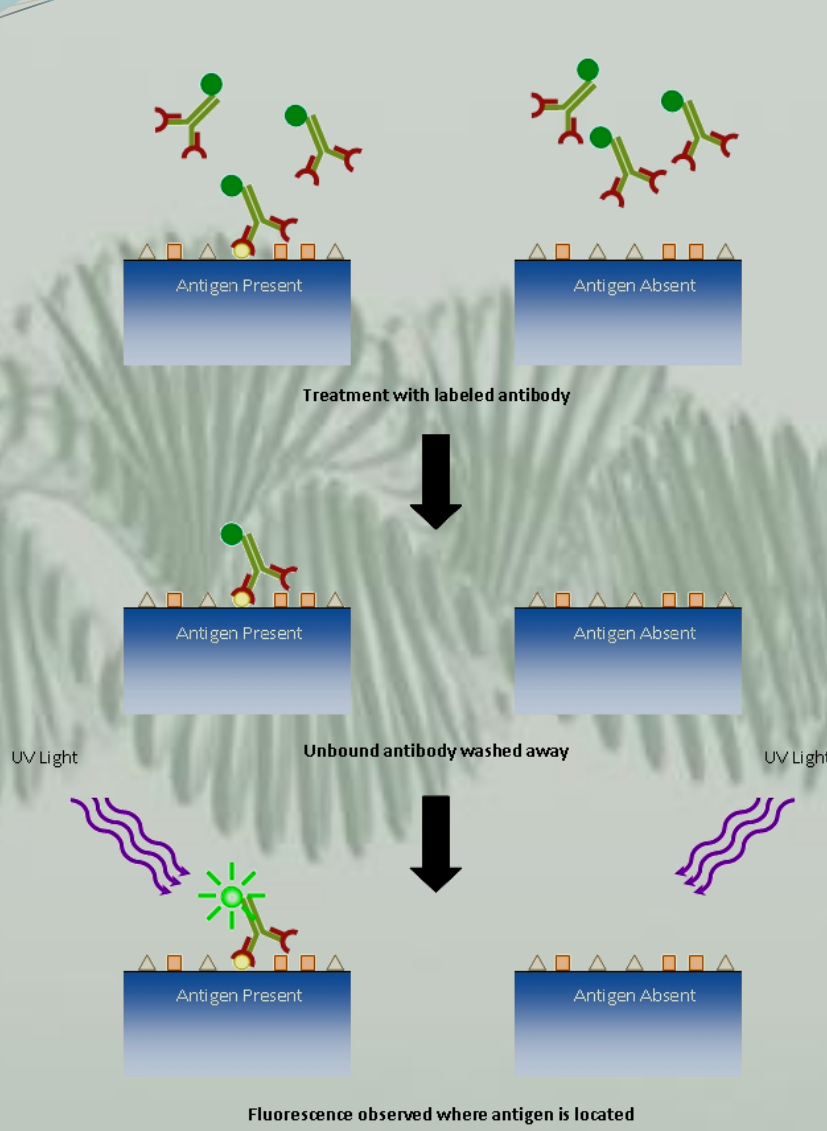


ESQUEMA DE ANTICUERPO

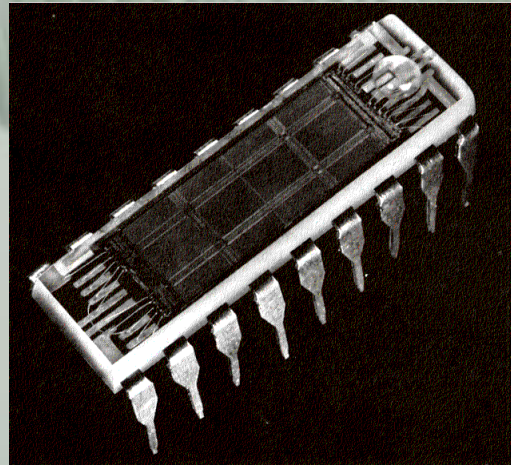
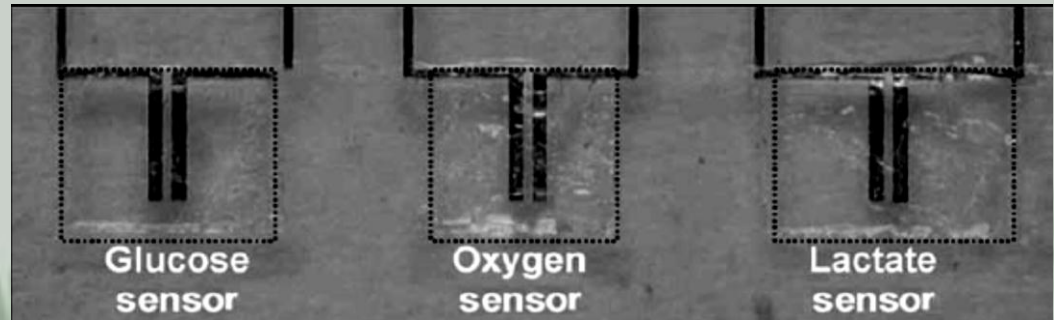
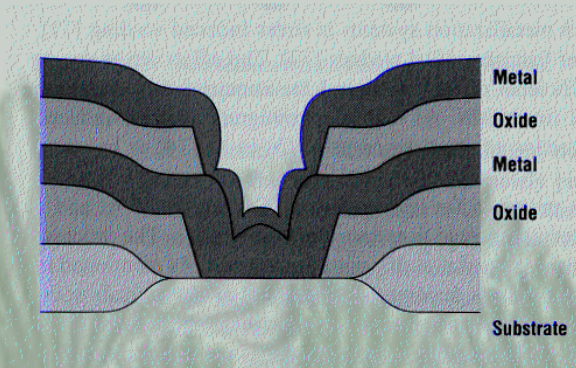


Genes de Anticuerpo

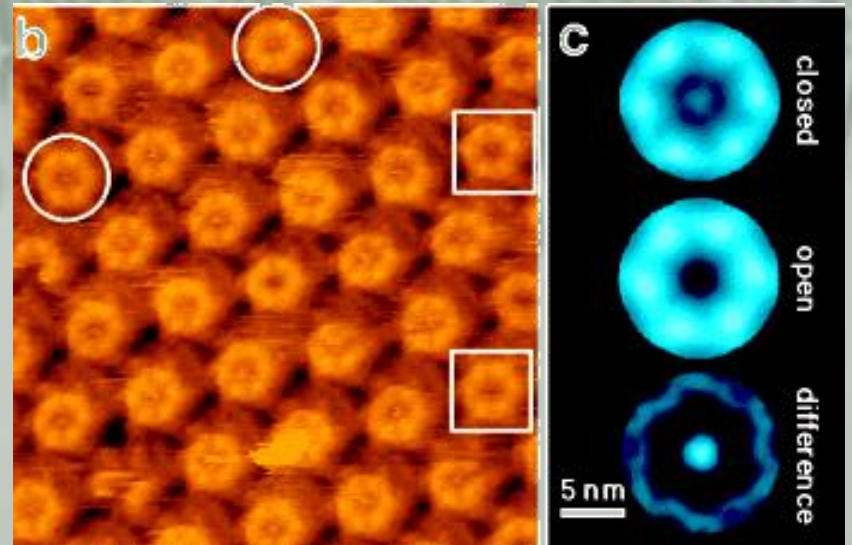
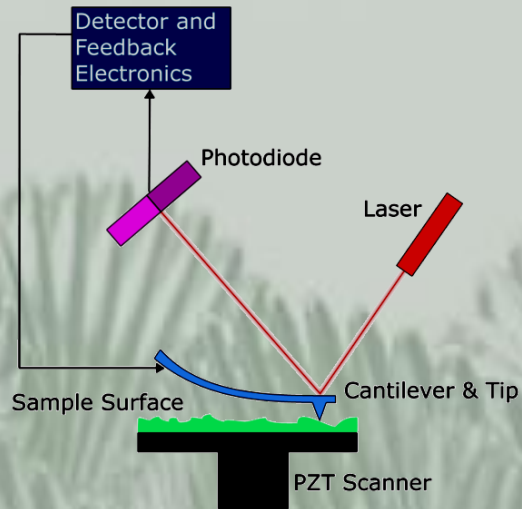




Bio-MEMS-NEMS

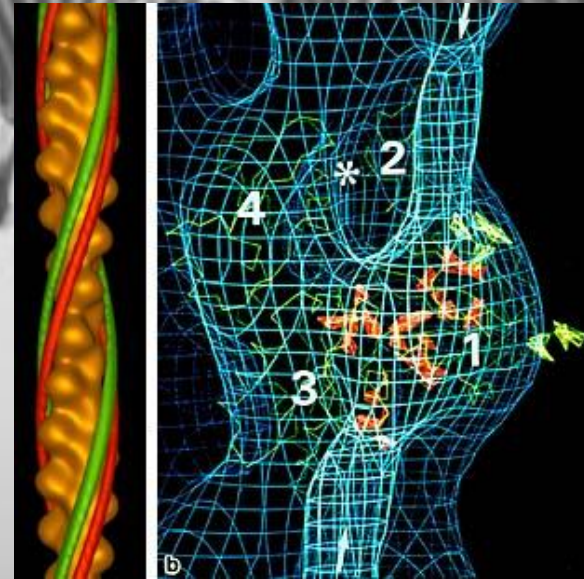


Microscopía de Fuerza Atómica

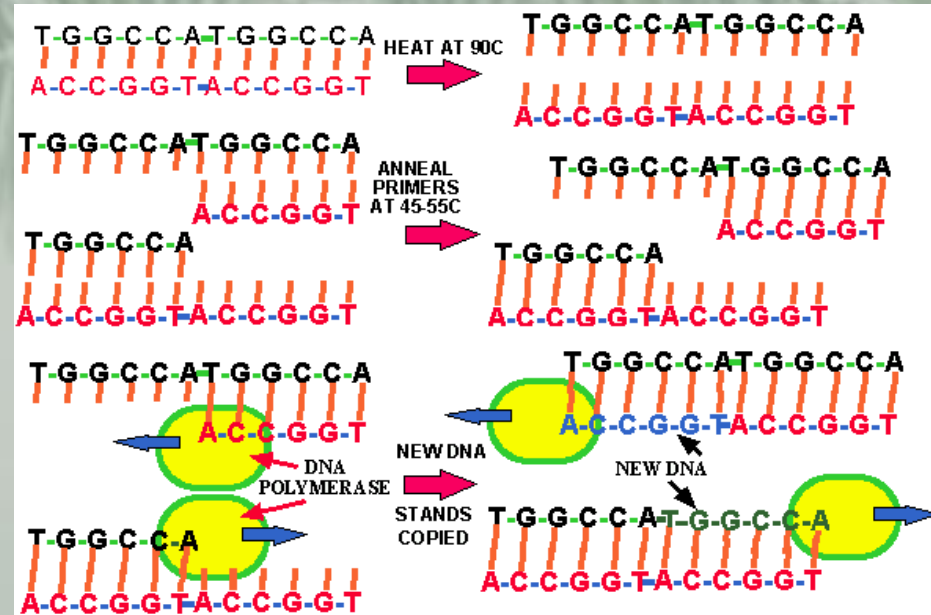
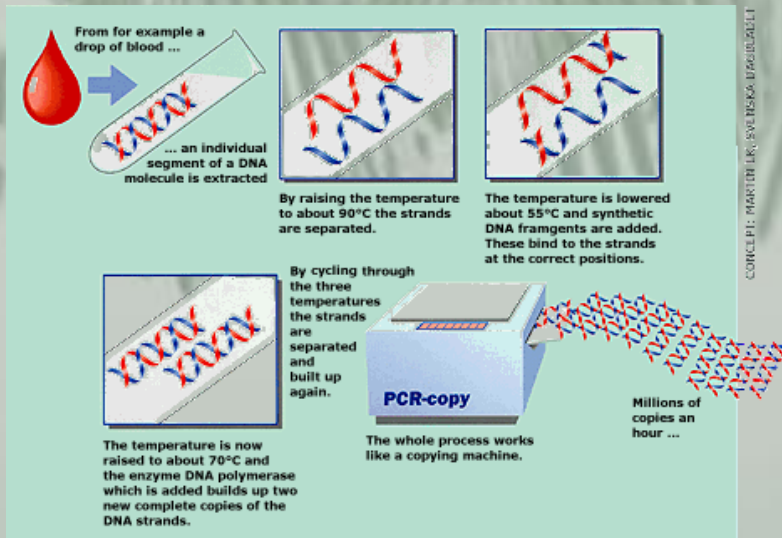
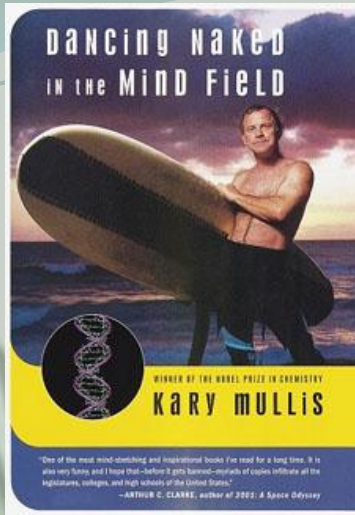




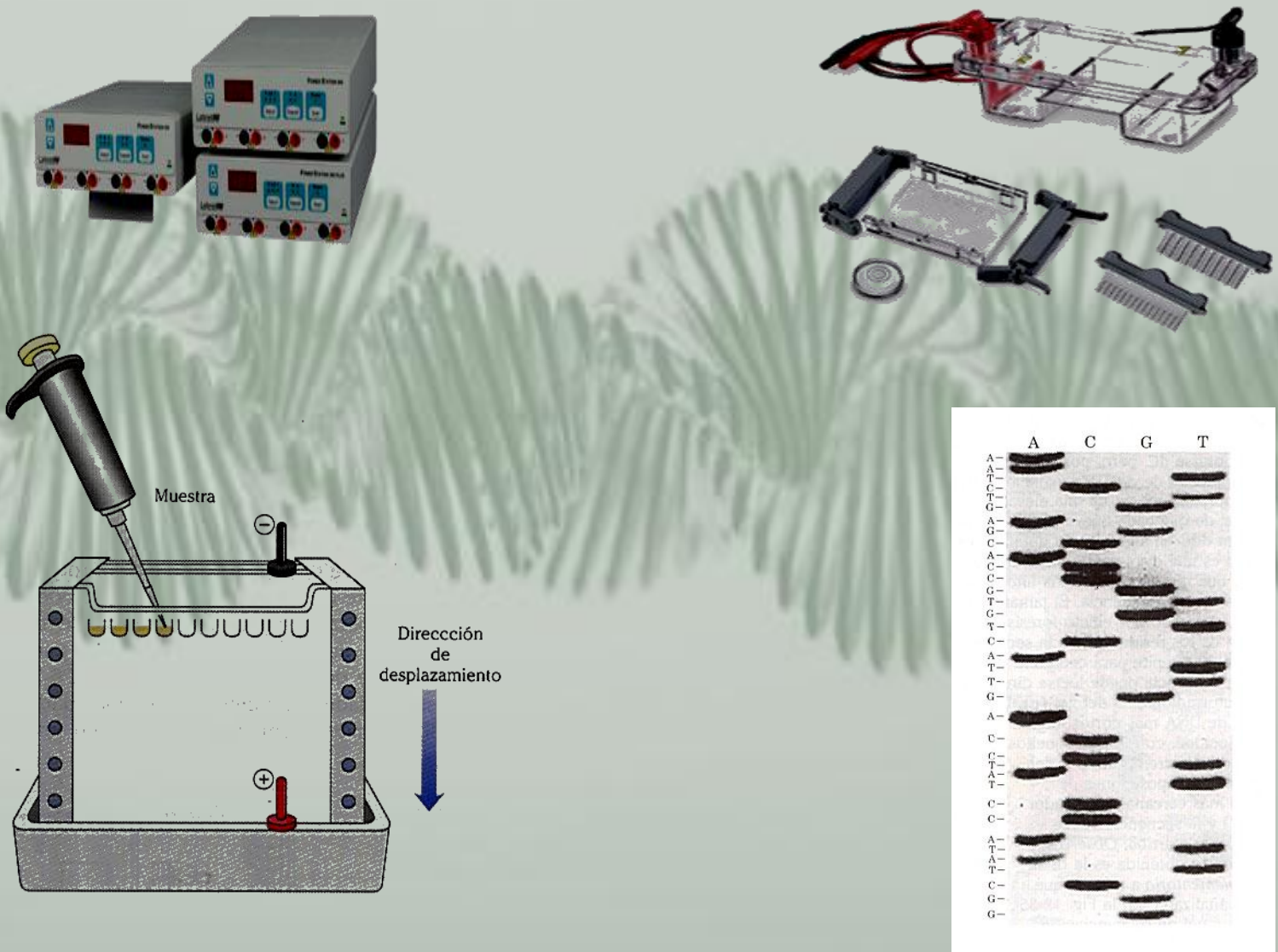
Bioingeniería Genómica y Proteómica



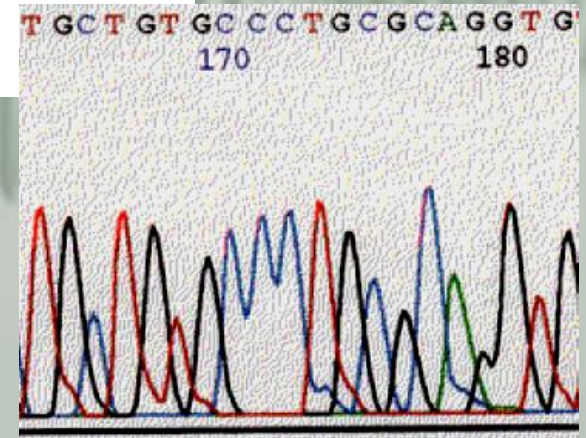
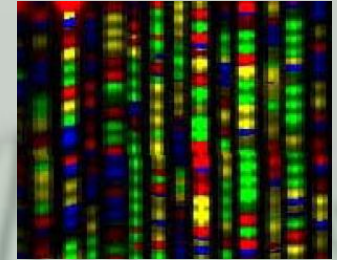
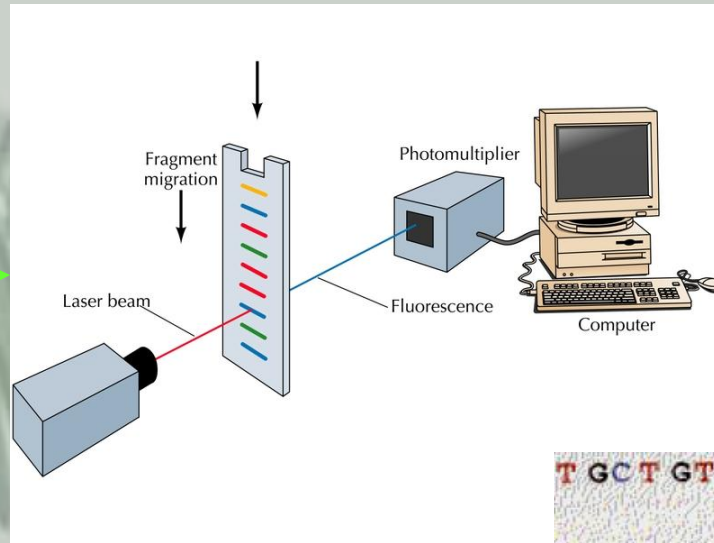
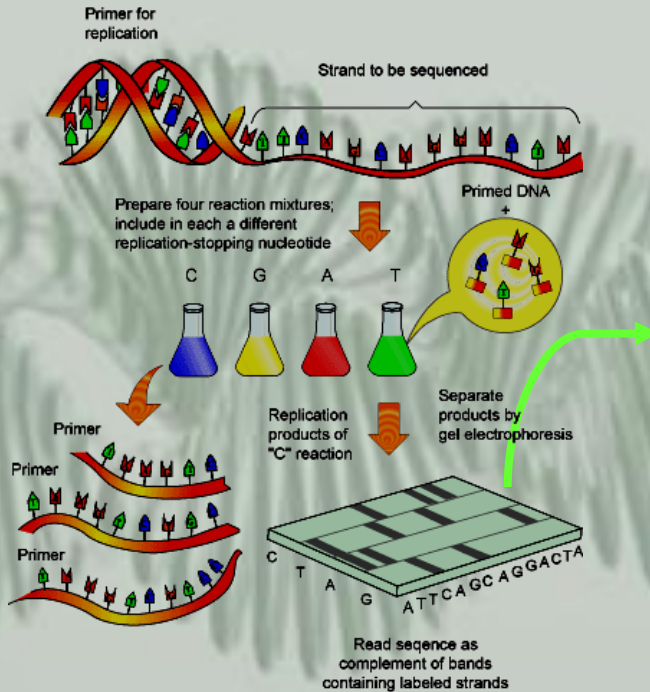




Electroforesis: El objetivo de esta técnica es, mediante un método bioquímico, basado en reacciones enzimáticas poder analizar de forma rápida la variabilidad genética que se puede encontrar en una población determinada.

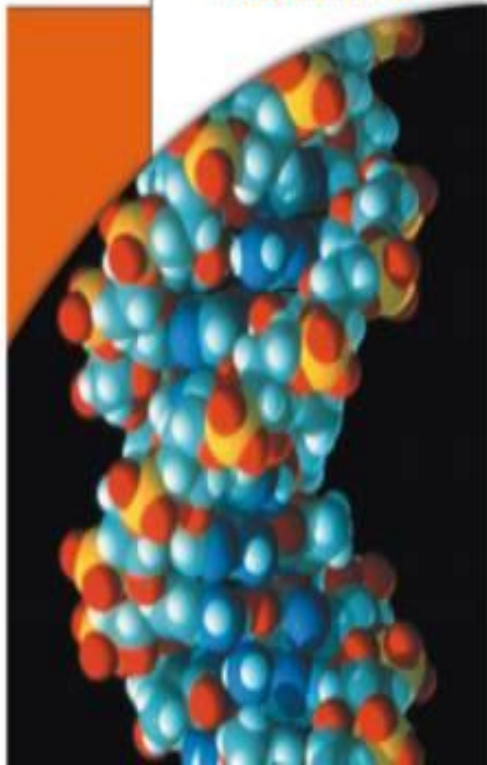


Secuenciamiento Genético



Discovery CHANNEL EDUCACION

EL GENOMA HUMANO



Finished Human Genome

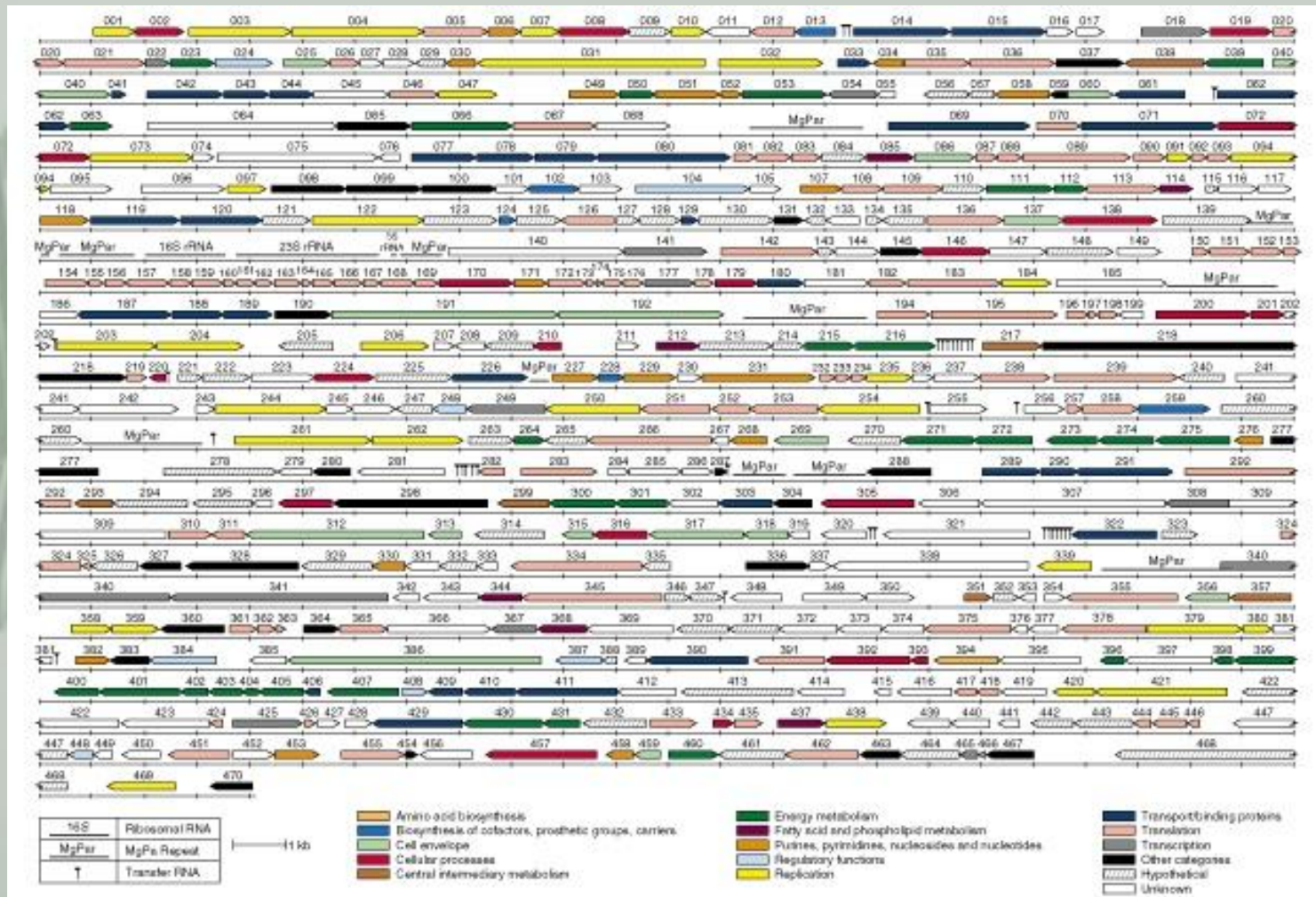
Human Genome Project

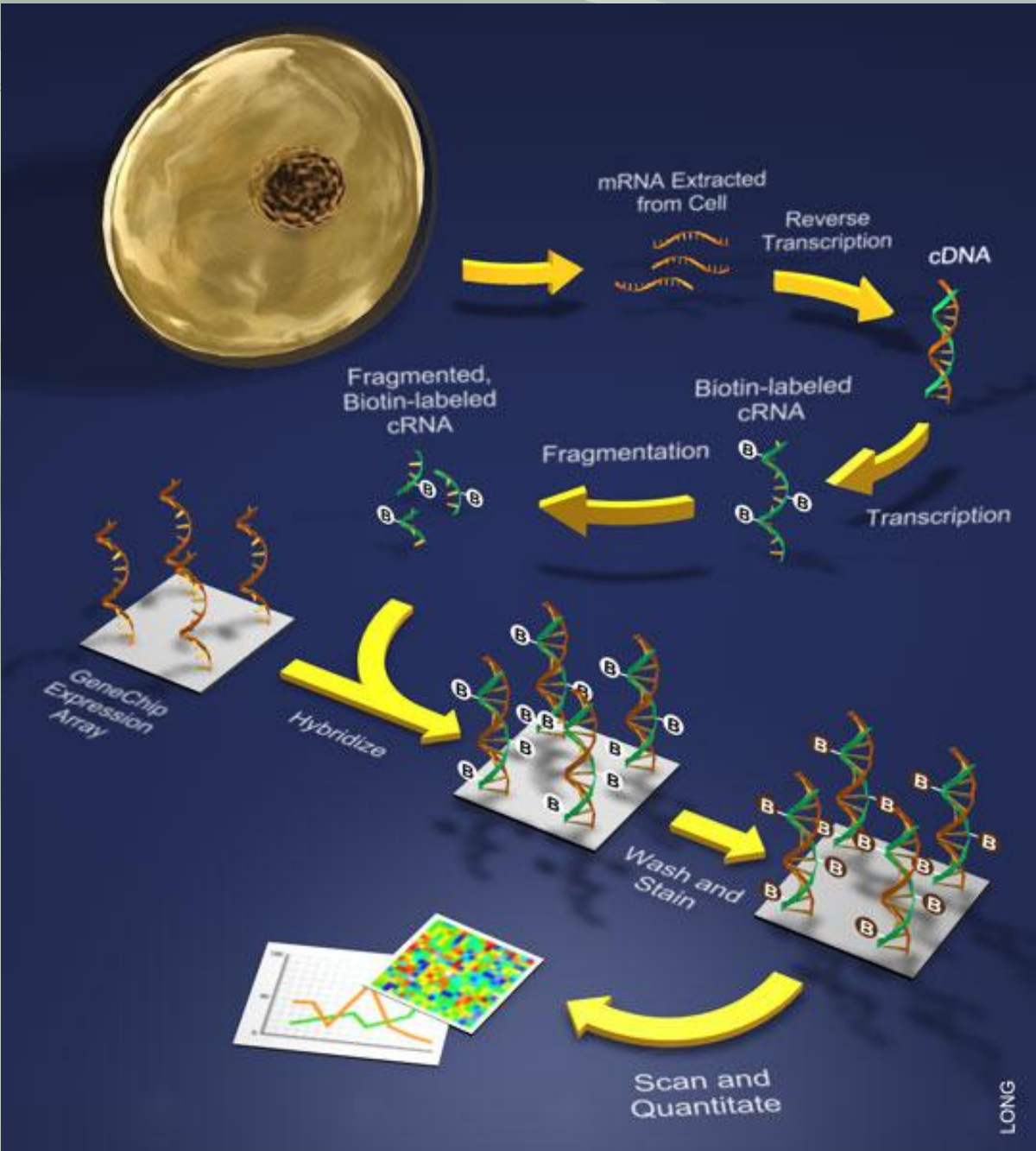


Wellcome Trust
Sanger Institute

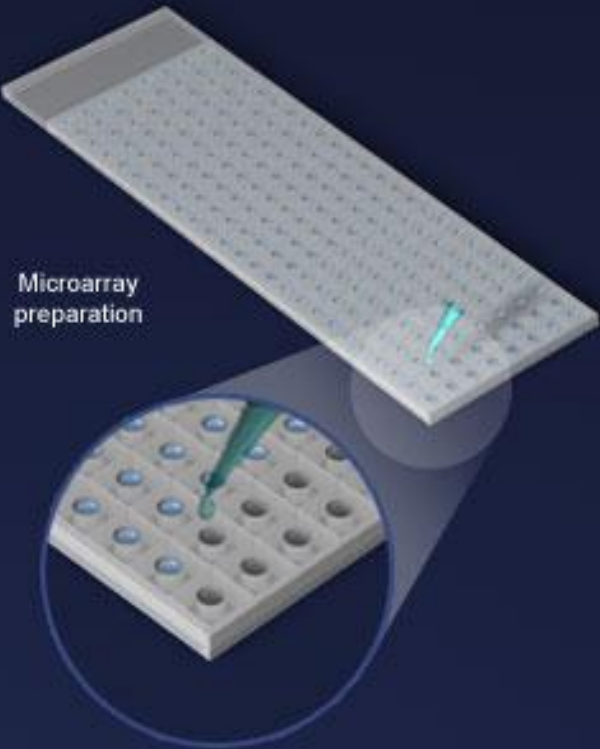


Mapa Genético Humano



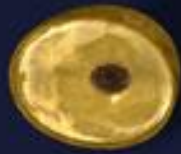


LONG



Control Cell

Experimental Cell



mRNA extracted from cell



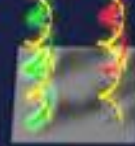
Reverse transcription, fluorescently labeled with Cy3 (Green) and Cy5 (Red)



Combine equal amount and hybridize onto microarray



cDNA microarray



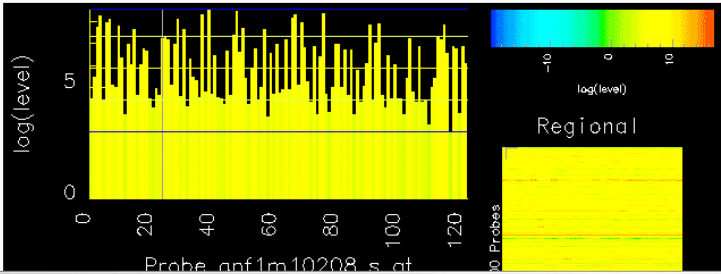
Scan



Dataset Info Probesets Samples

Showing rows 26 to 50 of 31373. Page: [Up](#) [Down](#) Jump to: [Top](#) [Bottom](#) Show 25 probes.

Row	probe_id	mgi_link	symbol	chr	min	max	mean	sd	curr
26	gnf1m10208_s_at	MGI:99208	Zfp7	15	3	8.52081	5.87178	1.42286	7.259
27	gnf1m16599_at	MGI:2139736	Zfp697	3	2.848	7.41109	4.56136	0.729591	4.426
28	gnf1m13753_a_at	MGI:1919270	Zfp654	16	4.54226	8.89996	7.11755	0.66716	7.715
29	gnf1m28588_at	MGI:107342	Zfp64	2	3	5.26679	3.76948	0.423293	3.596
30	gnf1m08828_a_at	MGI:2448537	Zfp637	6	1.88753	6.67101	3.74373	0.907804	3.364
31	gnf1m29933_at	MGI:2443465	Zfp612	8	1.20163	5.52669	2.61829	0.808127	3.754
32	gnf1m29932_a_at	MGI:2443465	Zfp612	8	1	7.57213	5.46919	0.890899	6.536
33	gnf1m15775_a_at	MGI:2670965	Zfp598	17	8.65678	11.4809	9.43265	0.46844	9.630
34	gnf1m16658_at	MGI:1916242	Zfp580	7	5.1819	9.47958	7.59849	1.07889	8.614
35	gnf1m16927_a_at	MGI:1921681	Zfp558	9	1	6.68229	4.14068	1.29878	6.139
36	gnf1m09762_a_at	MGI:2384725	Zfp553	7	6.04002	9.15305	8.22493	0.537375	8.779
37	gnf1m13823_a_at	MGI:99198	Zfp51	17	5.39917	8.97413	7.01733	0.714513	6.195
38	gnf1m30499_a_at	MGI:2385049	Zfp472	17	6.19967	8.57554	7.47685	0.432131	7.224
39	gnf1m31153_a_at	MGI:2137896	Zfp451	1	3.3505	7.60585	6.48268	0.751312	6.818
40	gnf1m29273_s_at	MGI:2143340	Zfp445	9	7.63445	10.5695	9.28347	0.59896	9.780
41	gnf1m29397_at	MGI:99185	Zfp40	17	2.45943	7.77413	4.68742	1.2463	3.548
42	gnf1m00278_s_at	MGI:1916506	Zfp397	18	7.8189	9.79133	8.56878	0.353462	8.414
43	gnf1m28589_at	MGI:1930708	Zfp386	12	1.88753	9.16717	7.67482	1.09604	7.167
44	gnf1m15332_at	MGI:1920979	Zfp383	7	3.10434	10.0471	6.57557	1.46107	7.593
45	gnf1m16888_a_at	MGI:99181	Zfp37	4	1.72247	8.00282	6.18519	1.05491	7.238



Import Analyze Display Save/Email

IMPORT Large-scale analysis of the mouse transcriptome (G)

FIND Find what: Bmp
 In which table? probe profiles
 Match case Match partial word

RESTRICT PROBES Genome Coordinates:
 Gene Ontology (terms/ids): ion transport
 Mammalian Phenotype (terms/ids):
 Action:
 filter probes
 add mark column
 Name for mark colu:

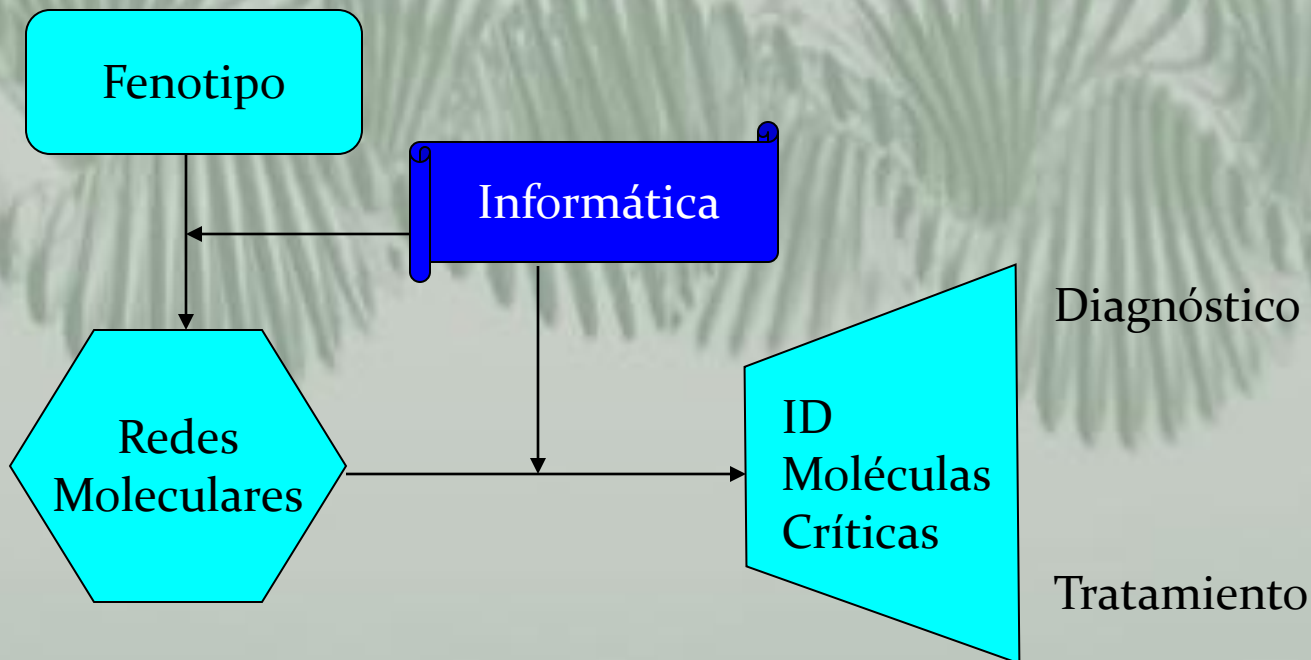
UNDO!

Execution Execute On Change

View: Front
 Mode: (None)

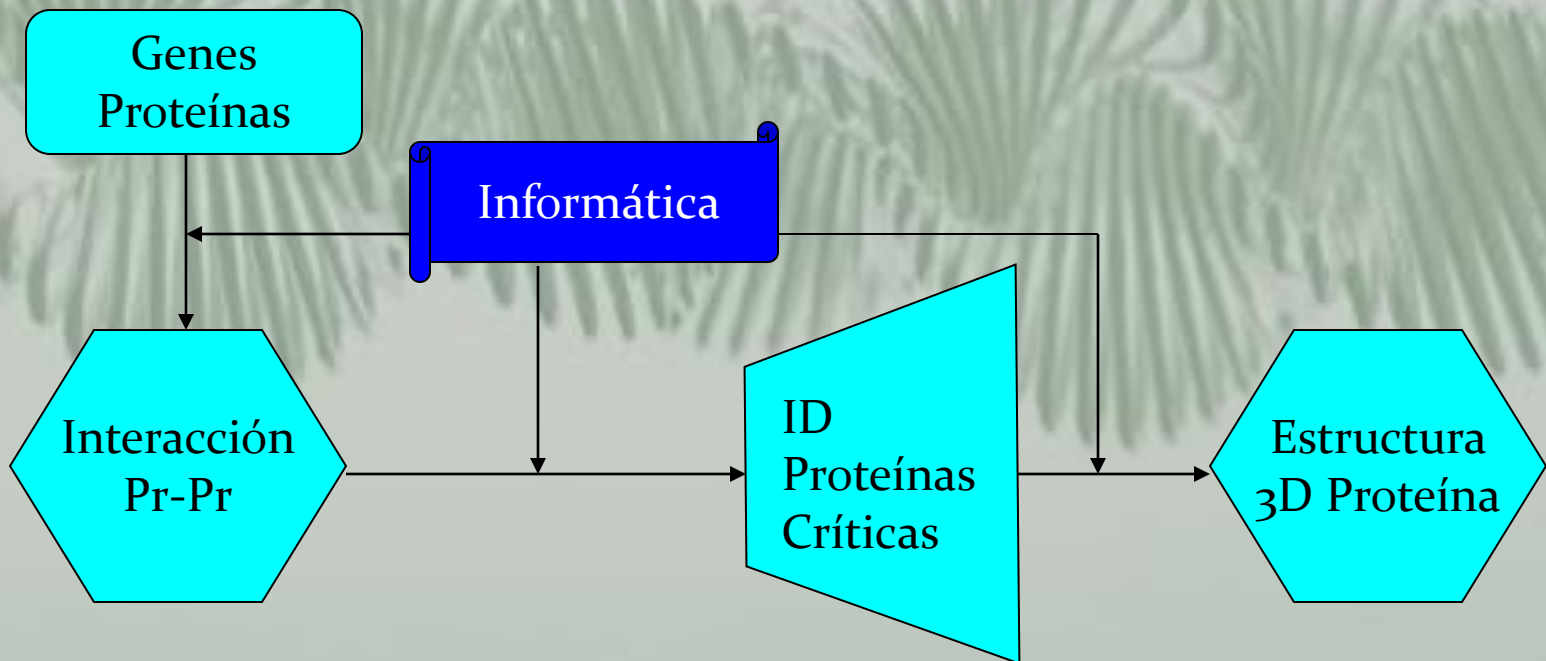
Biología de Sistemas

- La biología del siglo: Medicina personalizada



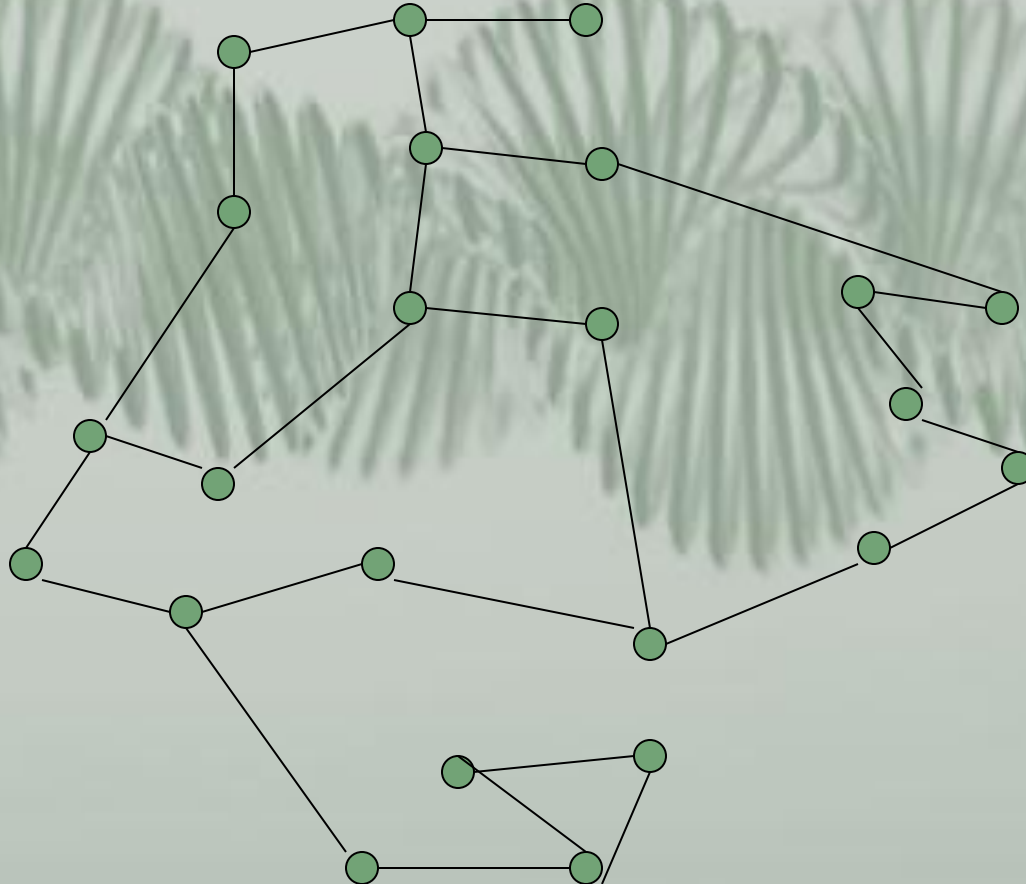
Biología de Sistemas

- Red Bioinformática para la predicción de la función molecular



Biología de Sistemas

- Redes: relaciones y complejidad



Biología de Sistemas

- Redes: relaciones y complejidad

Metabolismo de un organismo (levadura): 1,000
No. posible de redes con grado 4: 4×10^{10}

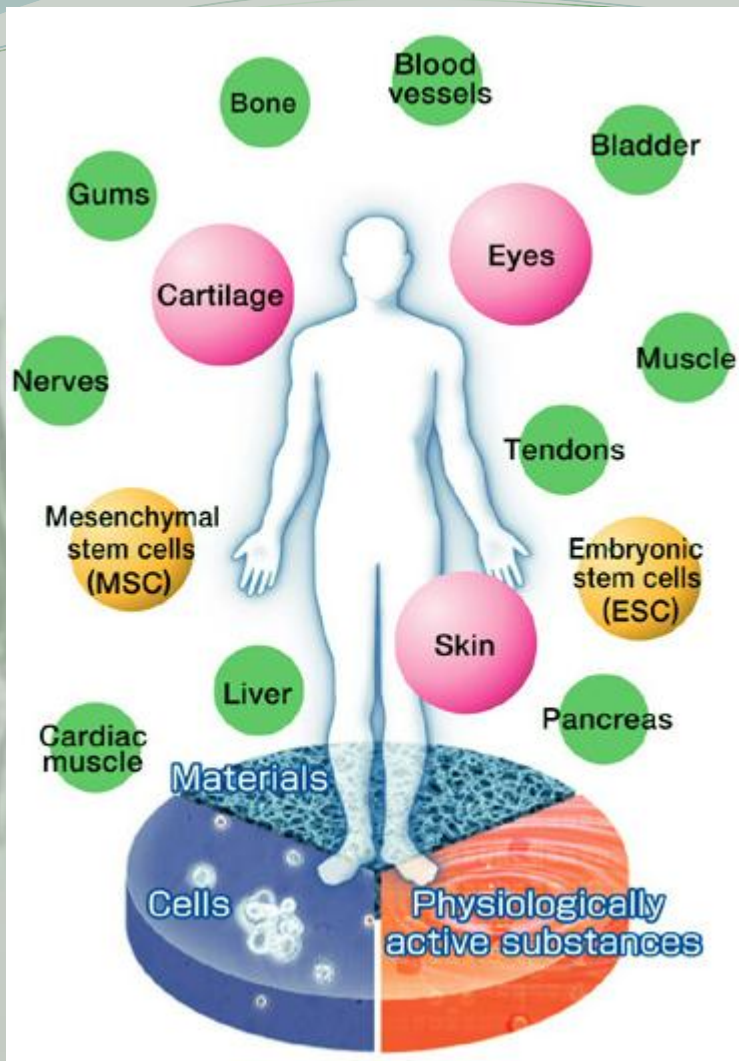
Proteínas de un organismo (levadura): 6,000
No. posible de redes con grado 8: 4×10^{25}

Amino ácidos en una proteína (α -Amilasa): 700
No. Posible de redes con grado 14: 6×10^{28}

Aproximaciones Diferentes

- Reparar
- Reemplazar
- Restaurar
- Regenerar

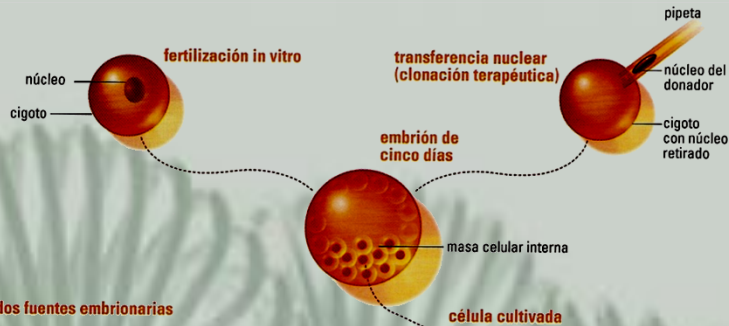




What is Regenerative Medicine

http://images.google.co.ve/imgres?imgurl=http://www.jppte.co.jp/english/technologies/img/figo.jpg&imgrefurl=http://www.jppte.co.jp/english/technologies/index.html&usq=__j4Kq1GP4v6Q3MxZBBLyrdqolmU=&h=553&w=400&sz=87&hl=es&start=1&sig2=Z0Aw8nlbdwWua5396EBFA&um=1&itbs=1&tbnid=RriTzwTvtzWnqM.&tbnh=133&tbnw=96&prev=/images%3Fq%3Dregenerative%2Bmedicine%26um%3D%26hl%3Des%26lr%3D%26rlz%3D1G1GGLQ_ESVE353%26tbs%3Disch1&ei=noTES53iNjyMtgO_mPXQDA

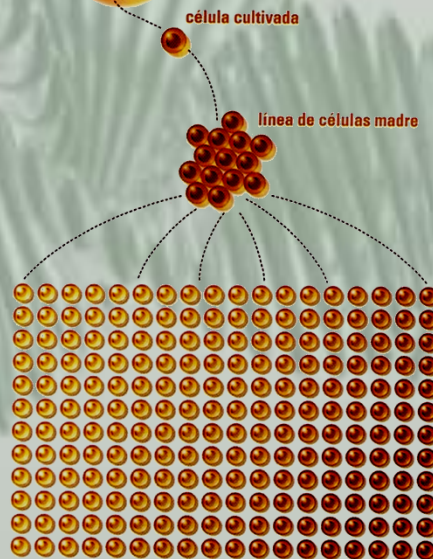
CM Embrionarias



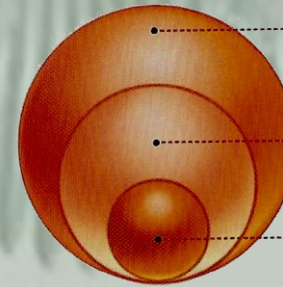
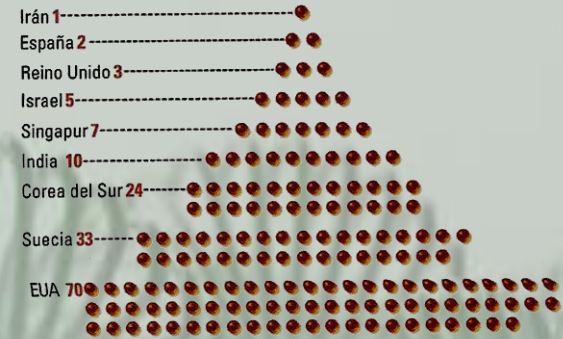
dos fuentes embrionarias

La mayoría de las células madre usadas en la investigación se extraen de embriones creados por la fertilización in vitro. Pero los científicos intentan obtener células de embriones creados con clonación terapéutica, en la que el núcleo de, digamos, una célula de piel se inserta en un cigoto cuyo núcleo ha sido retirado. De cualquier forma, tras cinco días, se transfiere la masa celular interna del embrión —con alrededor de 40 células— a un plato de cultivo que contiene células de alimentación. Cuando las células proliferan, son replantadas en nuevos platos de cultivo. Tras muchos meses, si las células madre originales se han dividido en millones de células saludables sin diferenciarse en células especializadas, se obtiene una línea de células madre embrionarias.

las células como medicina



se puede convertir en cualquiera de los más de 200 tipos de células del cuerpo



155 líneas de células madre embrionarias (total mundial)
 78 Con aprobación de fondos federales de EUA
 22 Con aprobación de fondos federales de EUA y disponibles para la investigación

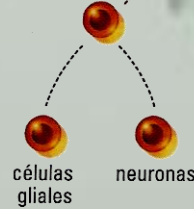
CM Adultas

lugares donde se han encontrado

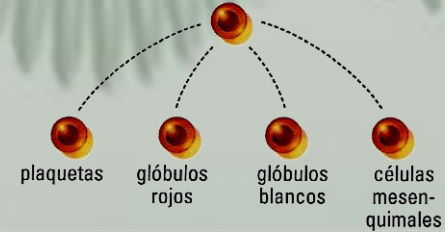
- cerebro
- sangre
- córnea
- retina
- corazón
- grasa
- piel
- pulpa dental
- médula ósea
- vasos sanguíneos
- músculo esquelético
- intestinos

○ cordón umbilical

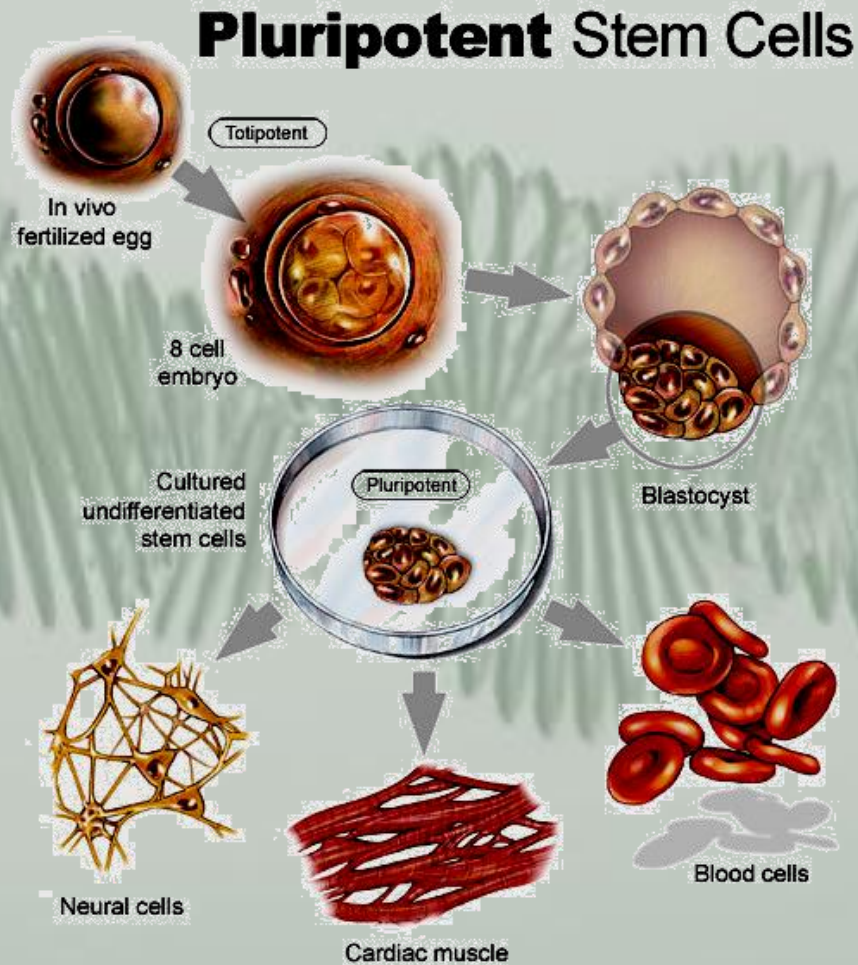
células madre neurales



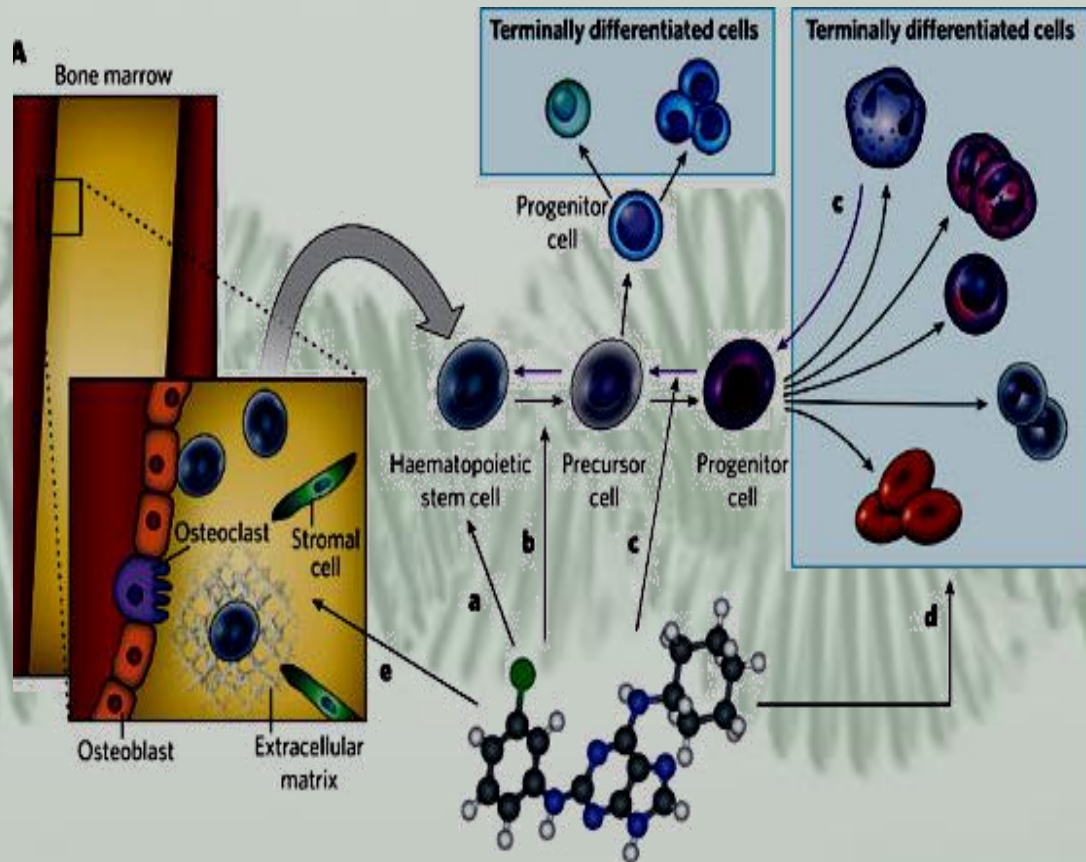
células madre del cordón umbilical



Especialización



Terapia Celular



[A chemical approach to stem-cell biology and regenerative medicine](#)

Yue Xu, Yan Shi & Sheng Ding
Nature 453, 338-344 (15 May 2008)
doi:10.1038/nature07042

Señalización Celular

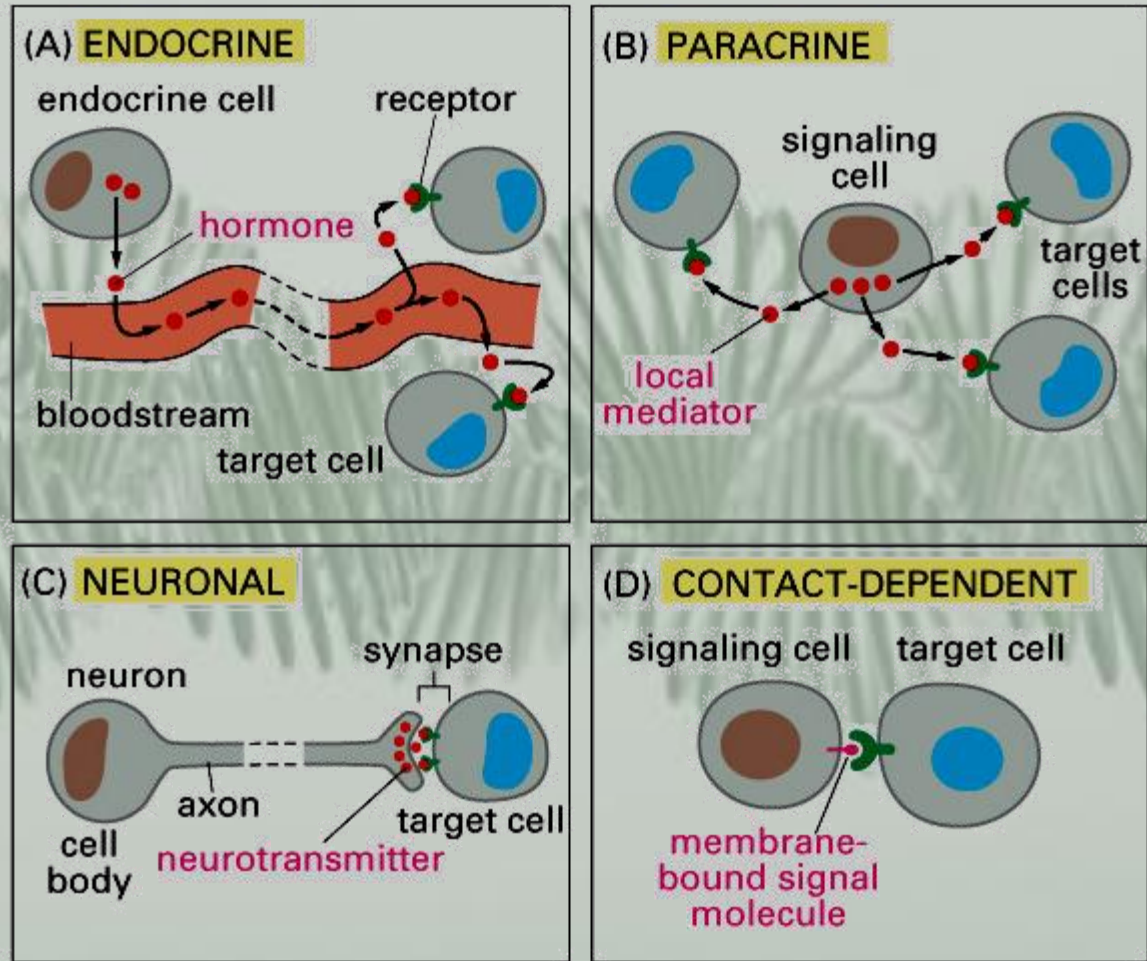
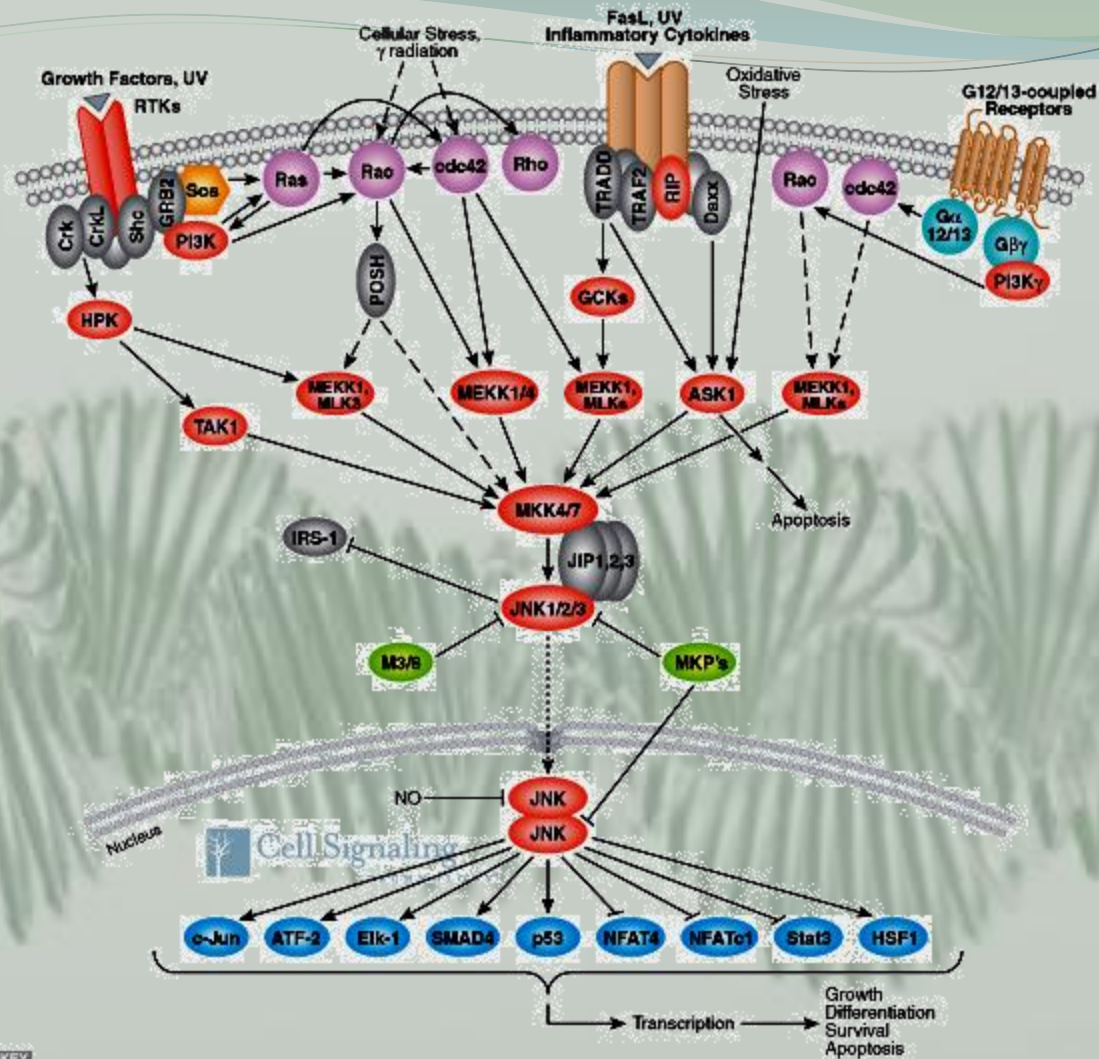


Figure 16-3 Essential Cell Biology, 2/e. (© 2004 Garland Science)



KEY

● Kinase

● Phosphatase

● Transcription Factor

\longrightarrow Direct Stimulatory Modification

\dashrightarrow Direct Inhibitory Modification

\dashrightarrow Multistep Stimulatory Modification

\dashrightarrow Multistep Inhibitory Modification

\dashrightarrow Tentative Stimulatory Modification

\dashrightarrow Tentative Inhibitory Modification

\dashrightarrow Transcriptional Stimulation

\dashrightarrow Transcriptional Inhibition

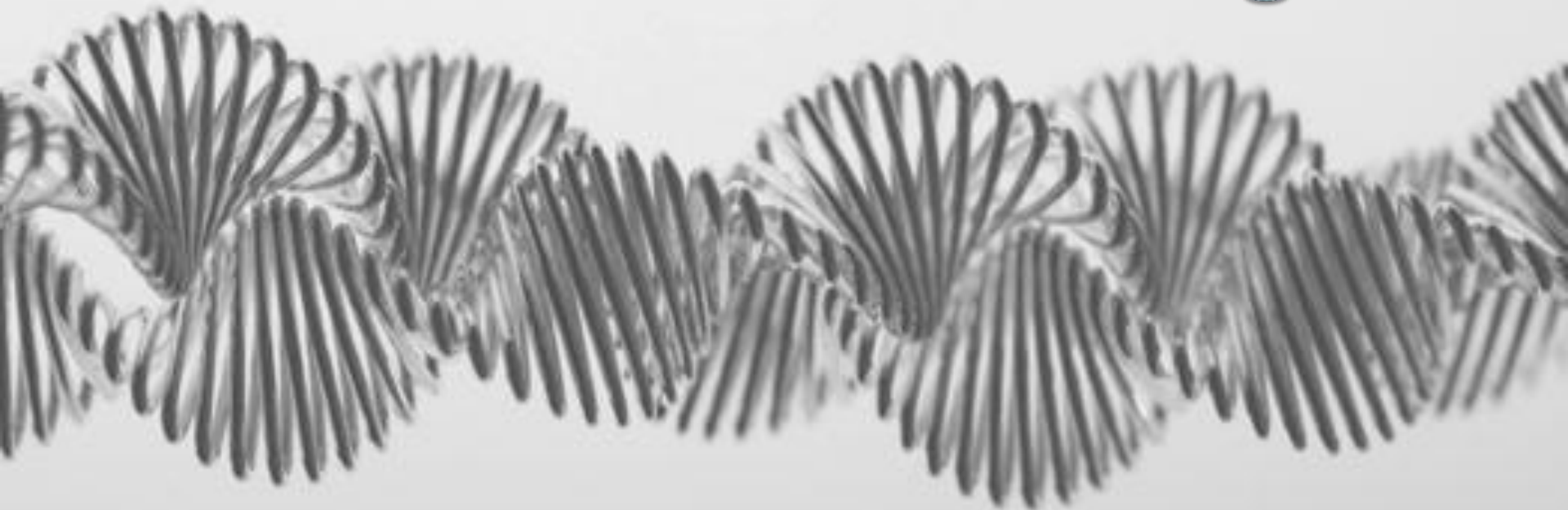
\cdots Translocation

\curvearrowright Separation of Subunits or Cleavage Products

\curvearrowleft Joining of Subunits

Growth
Differentiation
Survival
Apoptosis

Fábricas Biológicas



Mutación

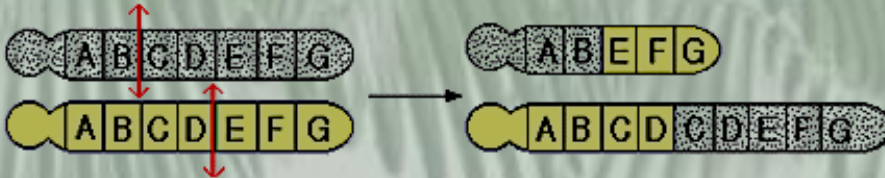
Point mutation



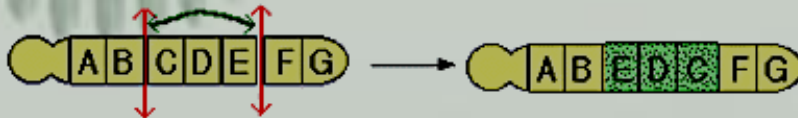
Deletion



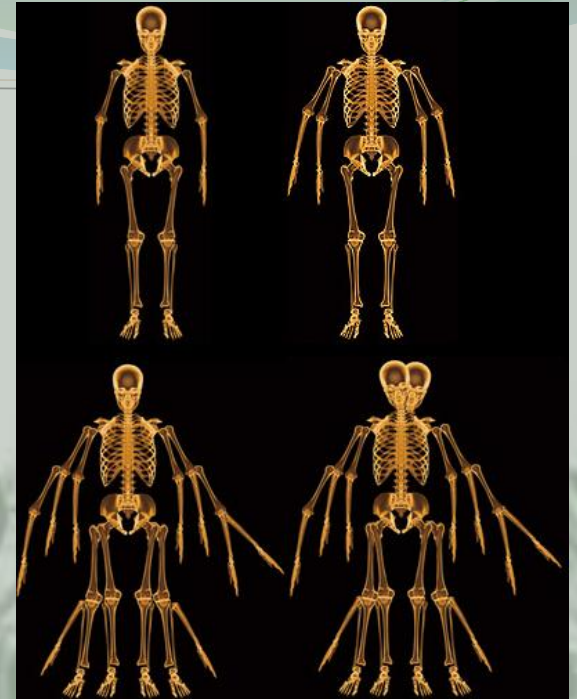
Translocation



Inversion



Mutations of Chromosomes



Fabricas Biológicas

