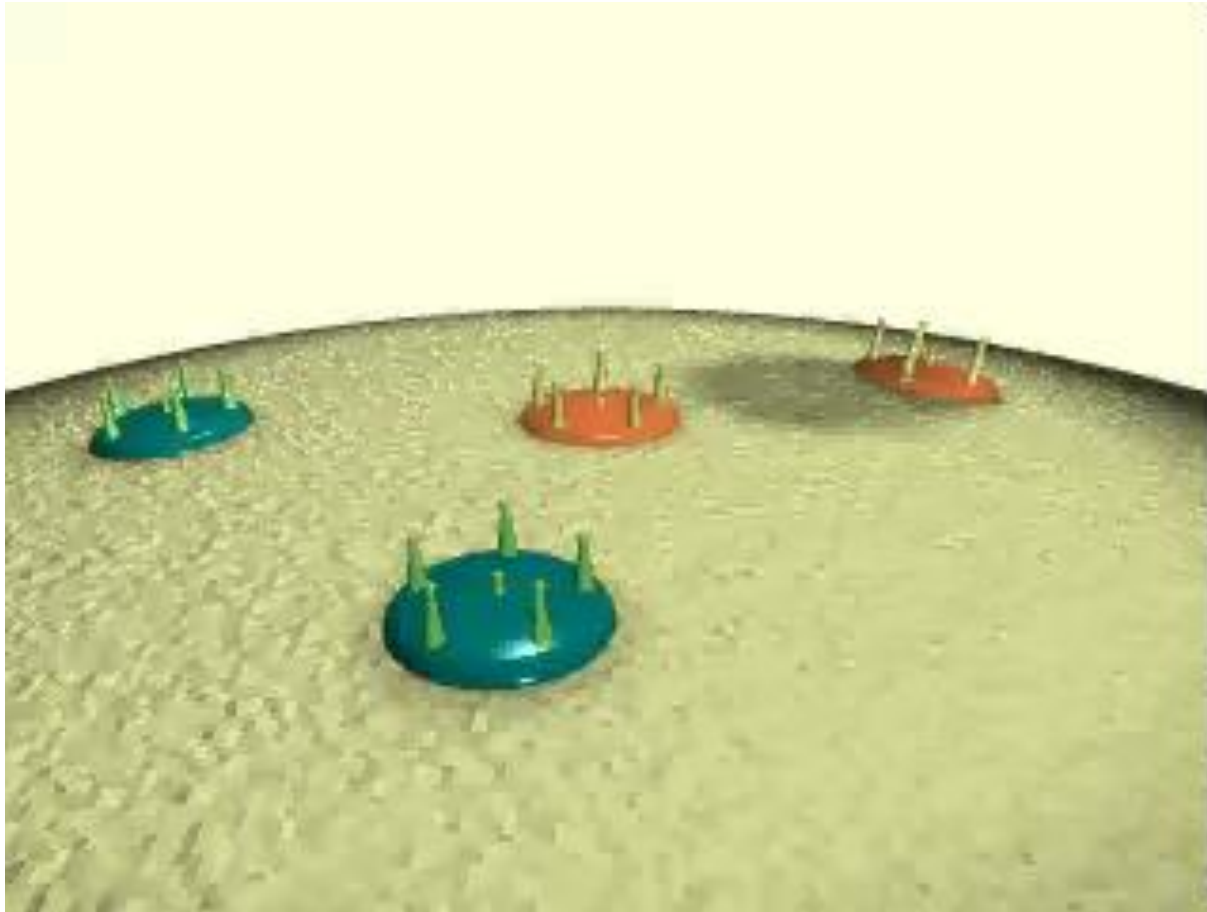
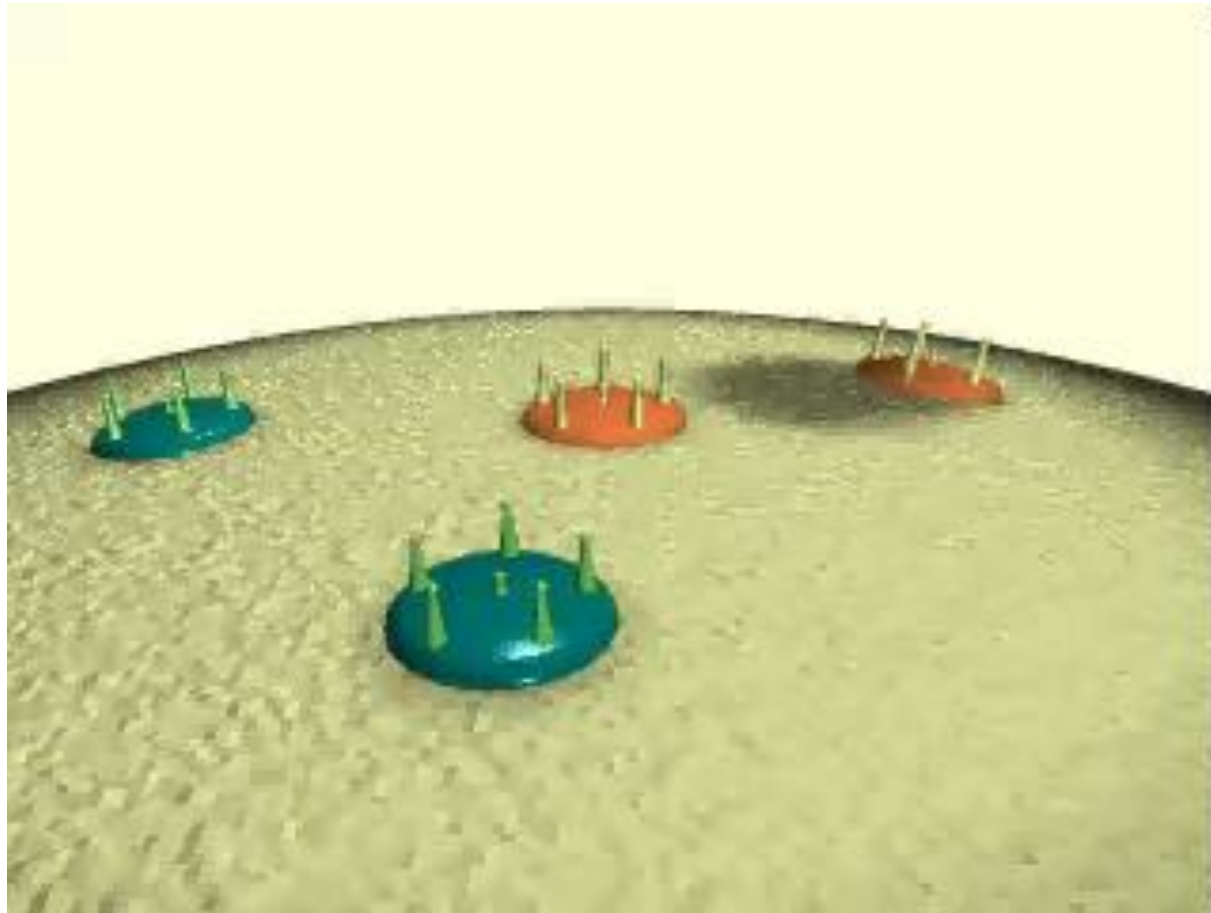


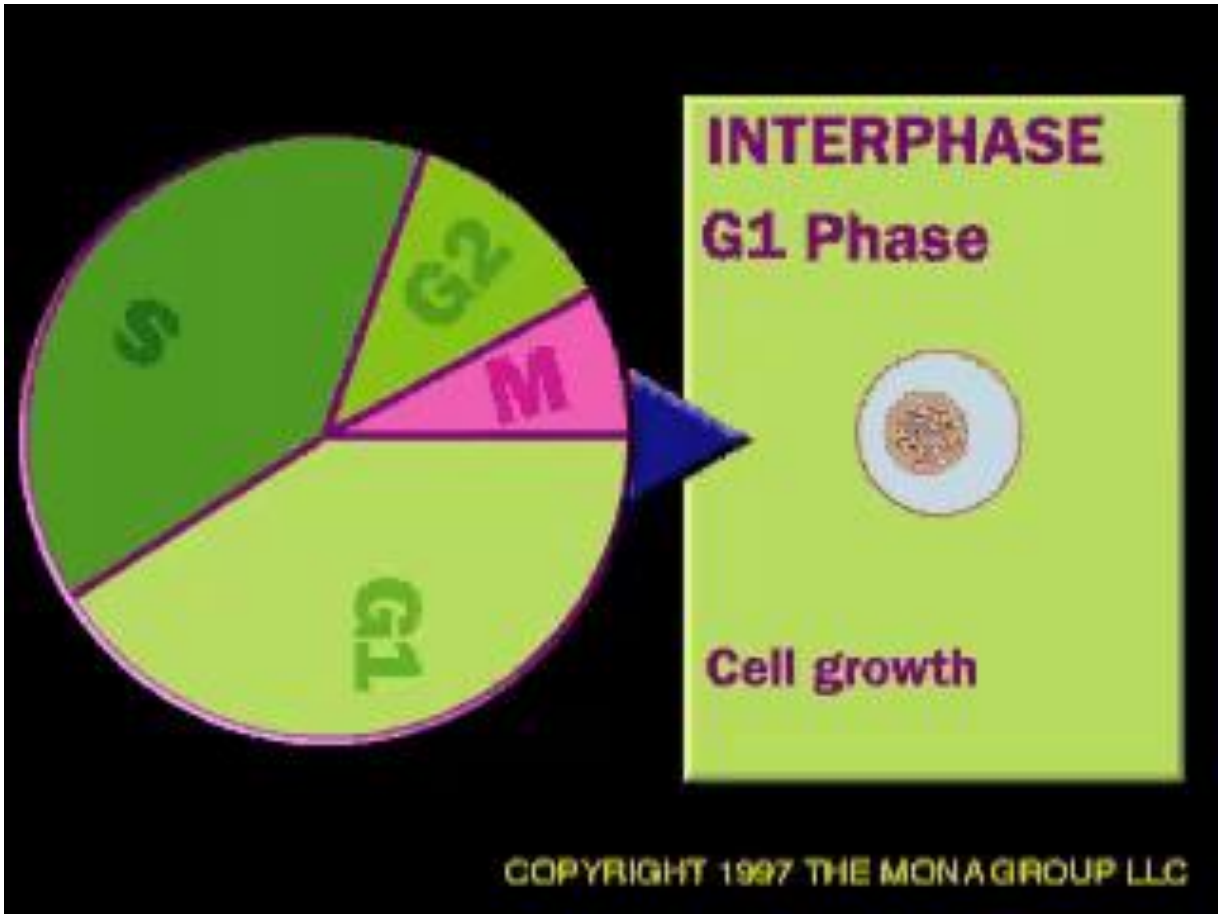
# División celular

mitosis

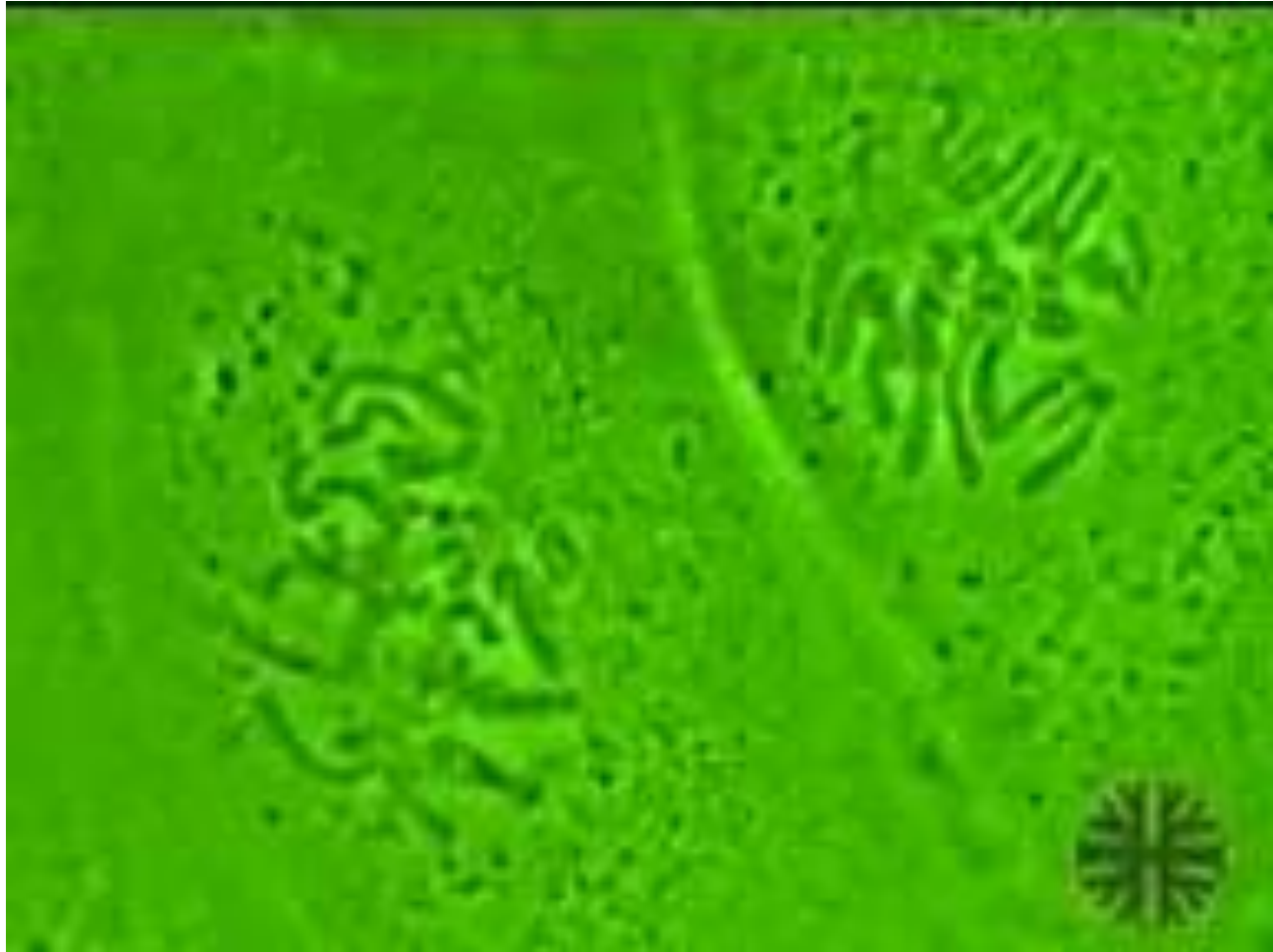
# fusion







# Mitosis en vegetales

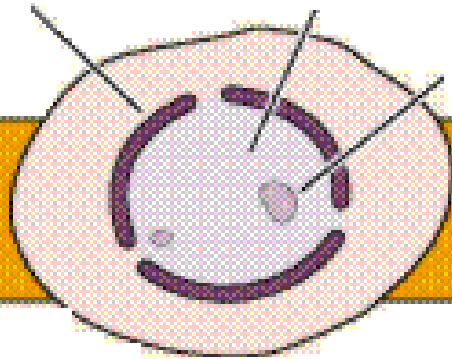


## Interfase

Membrana nuclear

Núcleo

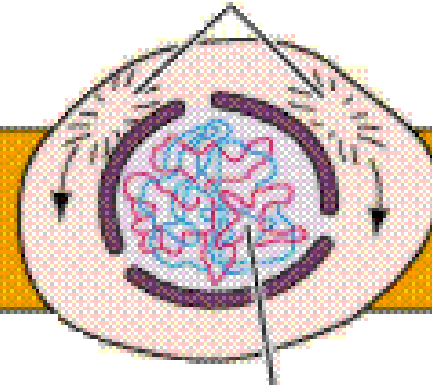
Nucleólo



El núcleo duplica su ADN y centrosomas

## Transición interfase profase

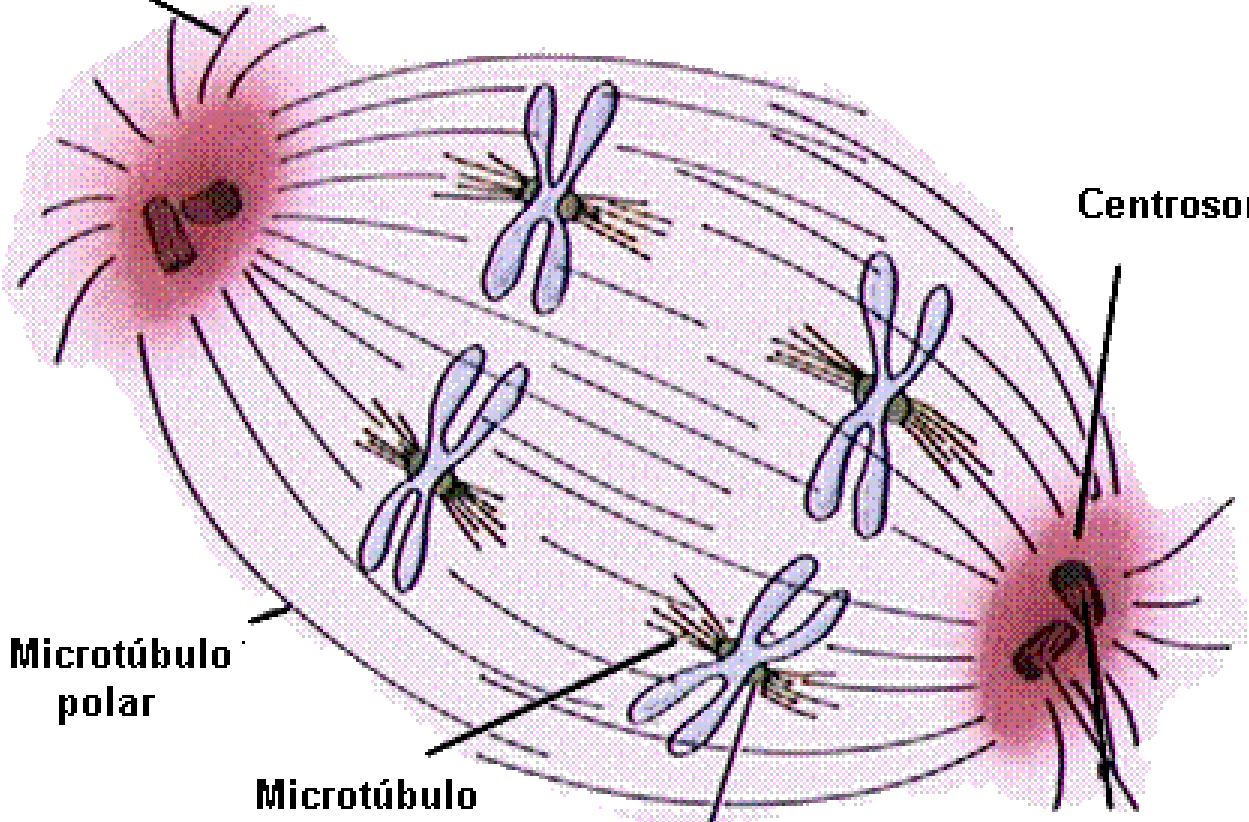
Centrosomas



Cromatina

La cromatina comienza a condensarse

Aster



Centrosoma

Microtúbulo polar

Microtúbulo del cinetocoro

Cinetocoro

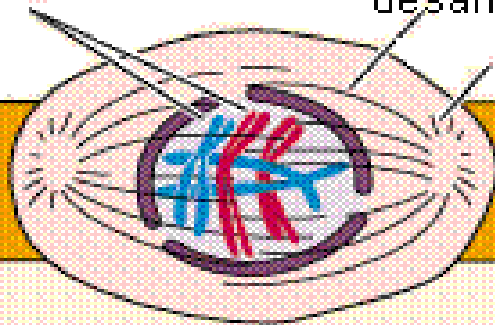
Par de centriolos

# Profase

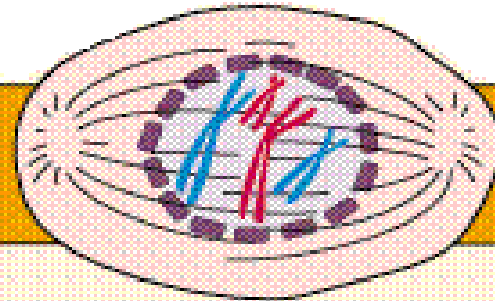
Cromátides de los cromosomas

Huso en desarrollo

Aster



# Prometafase



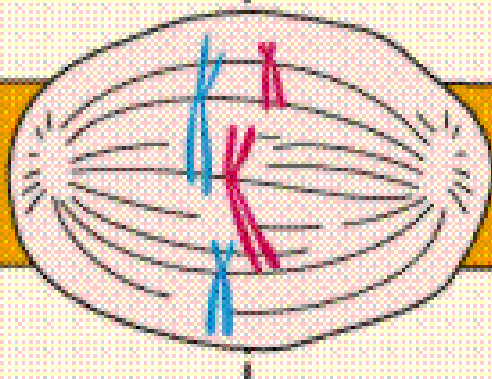
**La cromatina continúa enrollándose y superenrollándose, y por lo tanto compactándola cada vez más. El cromosoma consiste en dos cromátidas idénticas**

**La membrana nuclear se rompe. Los microtúbulos del cinetocoro interaccionan con los del huso, y el resultado es el movimiento de los cromosomas**



# Metafase

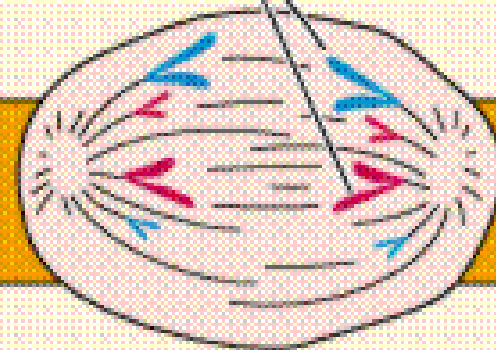
Placa ecuatorial



La región del centrómero (duplicada) que une las cromátidas se alinea en el plano ecuatorial de la célula

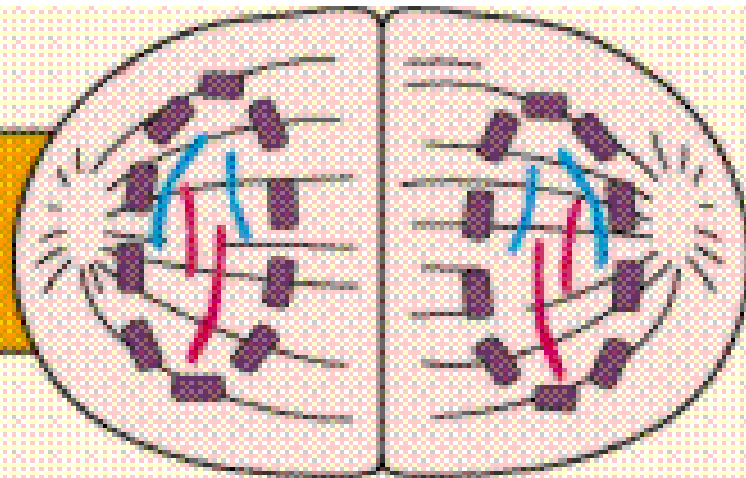
# Anafase

Cromosomas hijos



Cada centómero se divide, y el nuevo cromosoma (cada uno derivado de las cromátidas) comienza a moverse hacia los polos

# Telofase

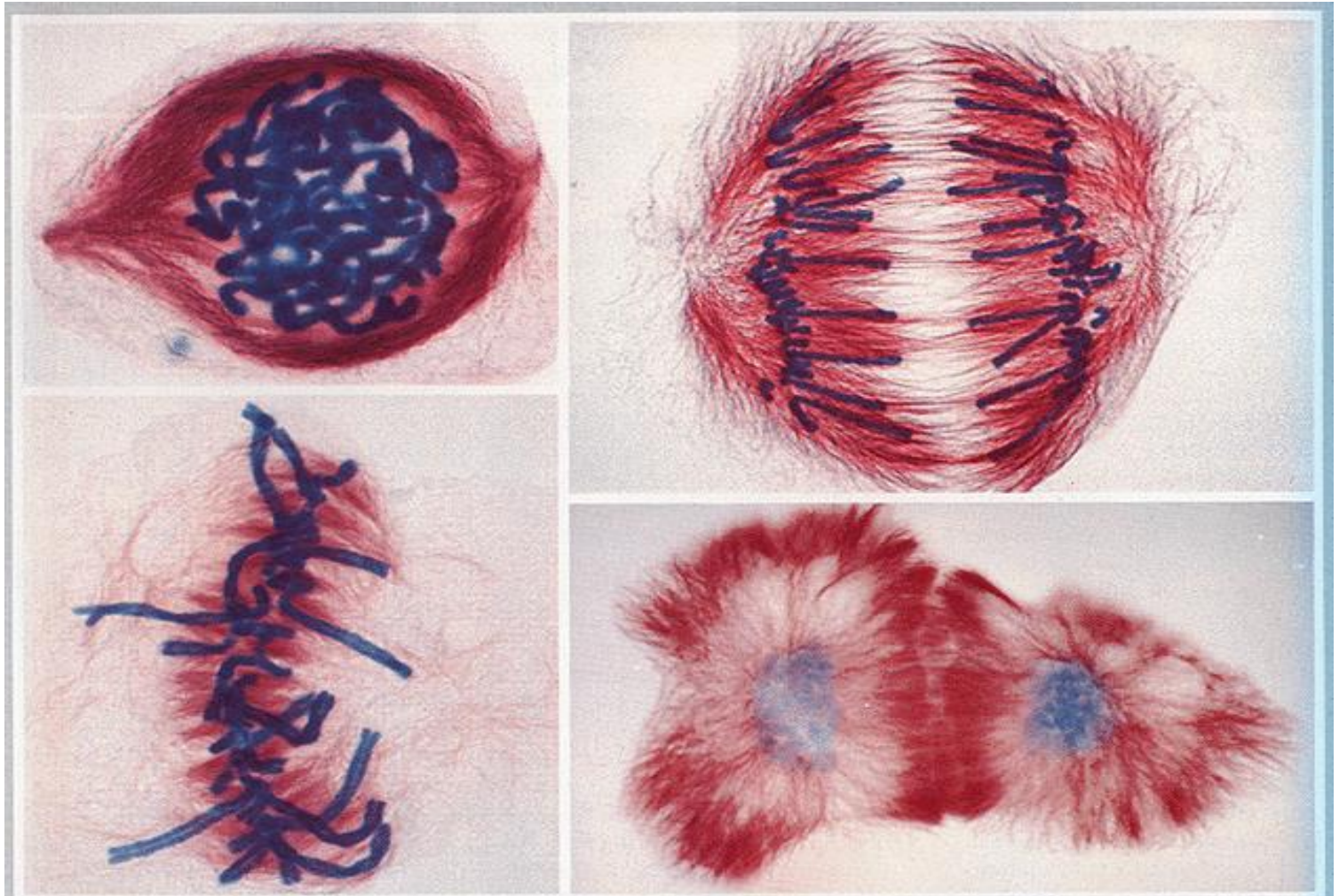


Los cromosomas llegan a los polos.

Se pasa a la próxima interfase, mientras se reconstituye la membrana nuclear y el nucleolo y la cromatina se vuelve difusa

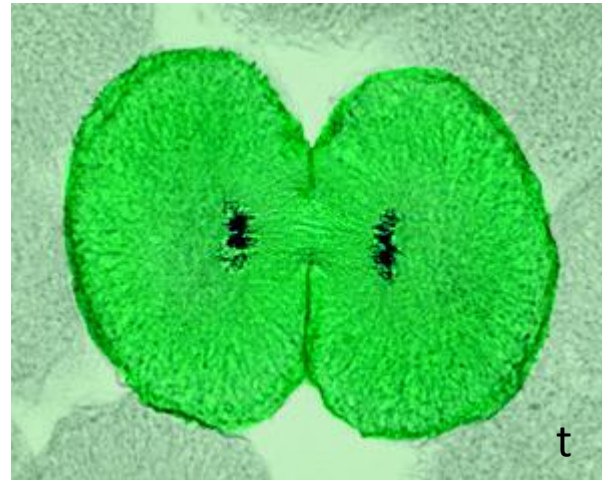
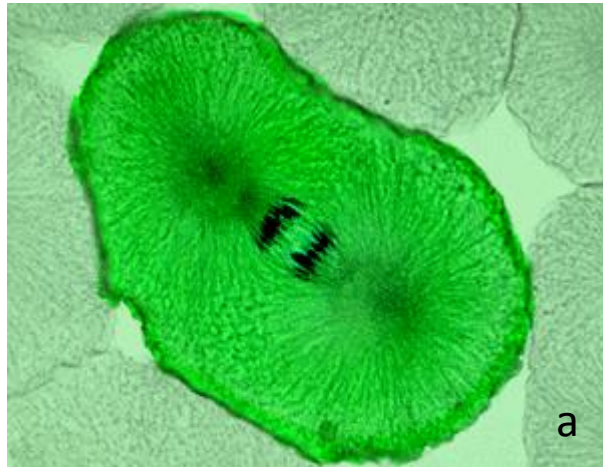
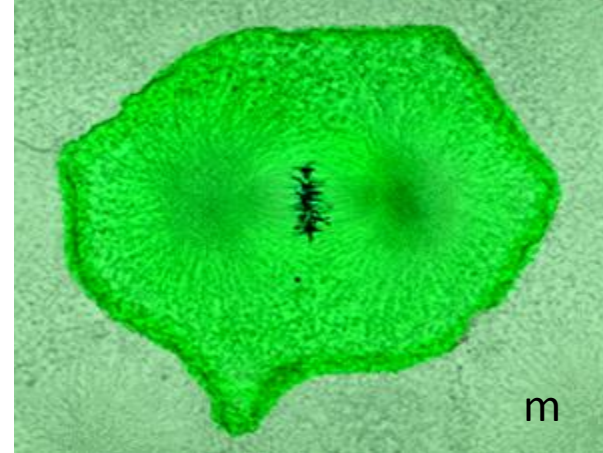
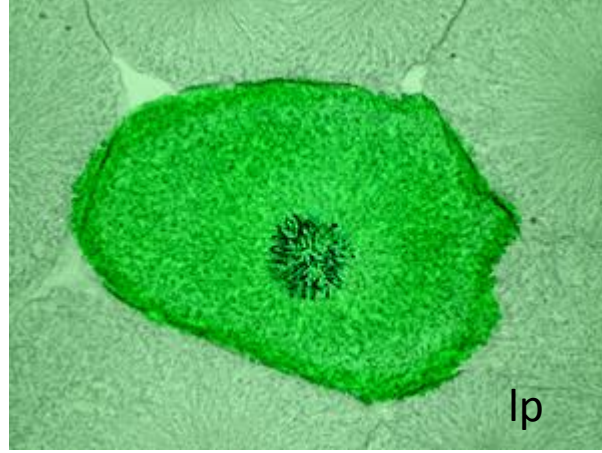
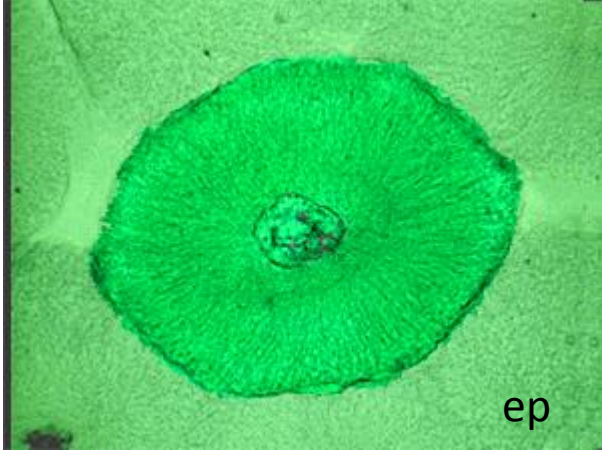
# Mitosis

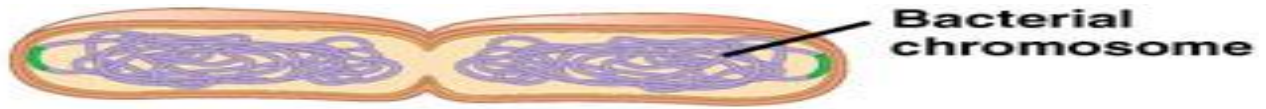




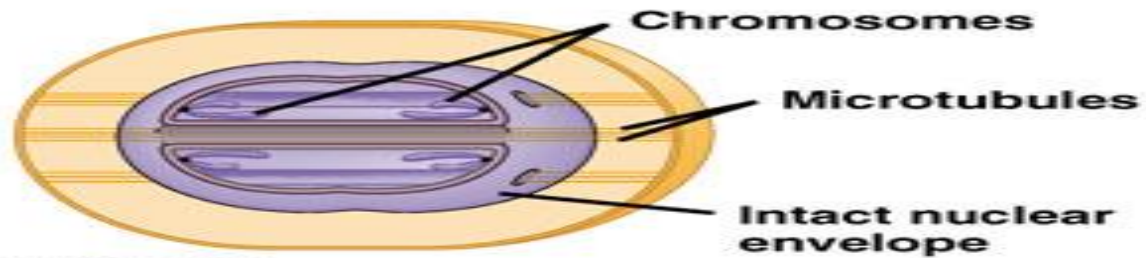
Piri cells in various stages of mitosis: (a) prophase; (b) metaphase; (c) anaphase; (d) telophase (all magnified about 2,700 times).



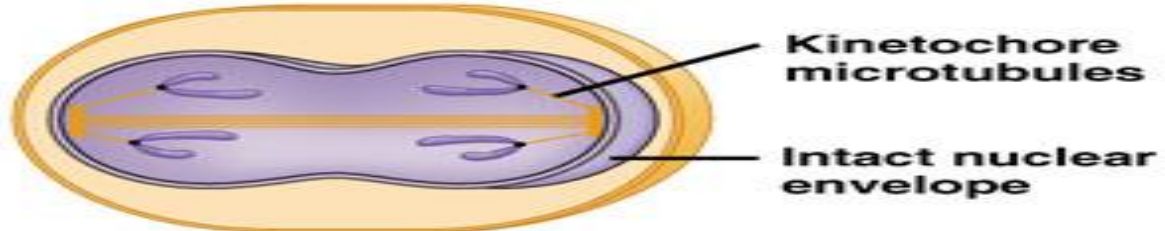




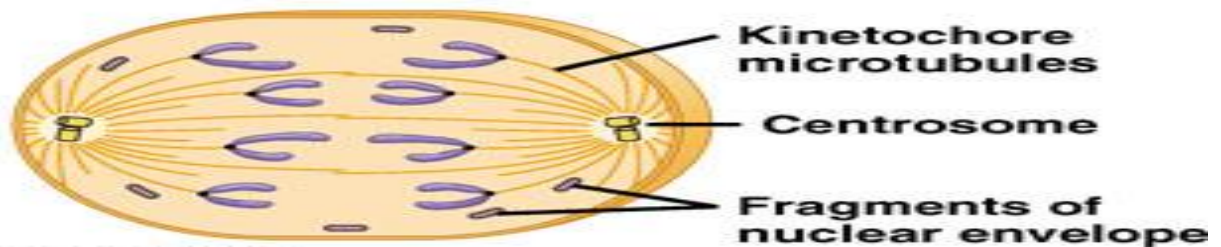
**(a) Prokaryotes**



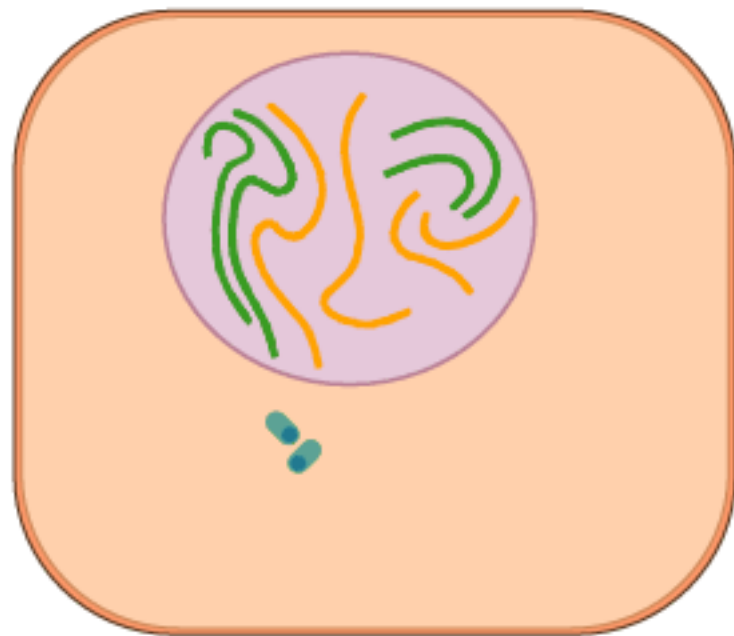
**(b) Dinoflagellates**



**(c) Diatoms**



**(d) Most eukaryotes**



Mitosis in tissue-cultured  
lung cell of a newt,  
*Traicha granulosa*, recorded  
with the new Pol-Scope.

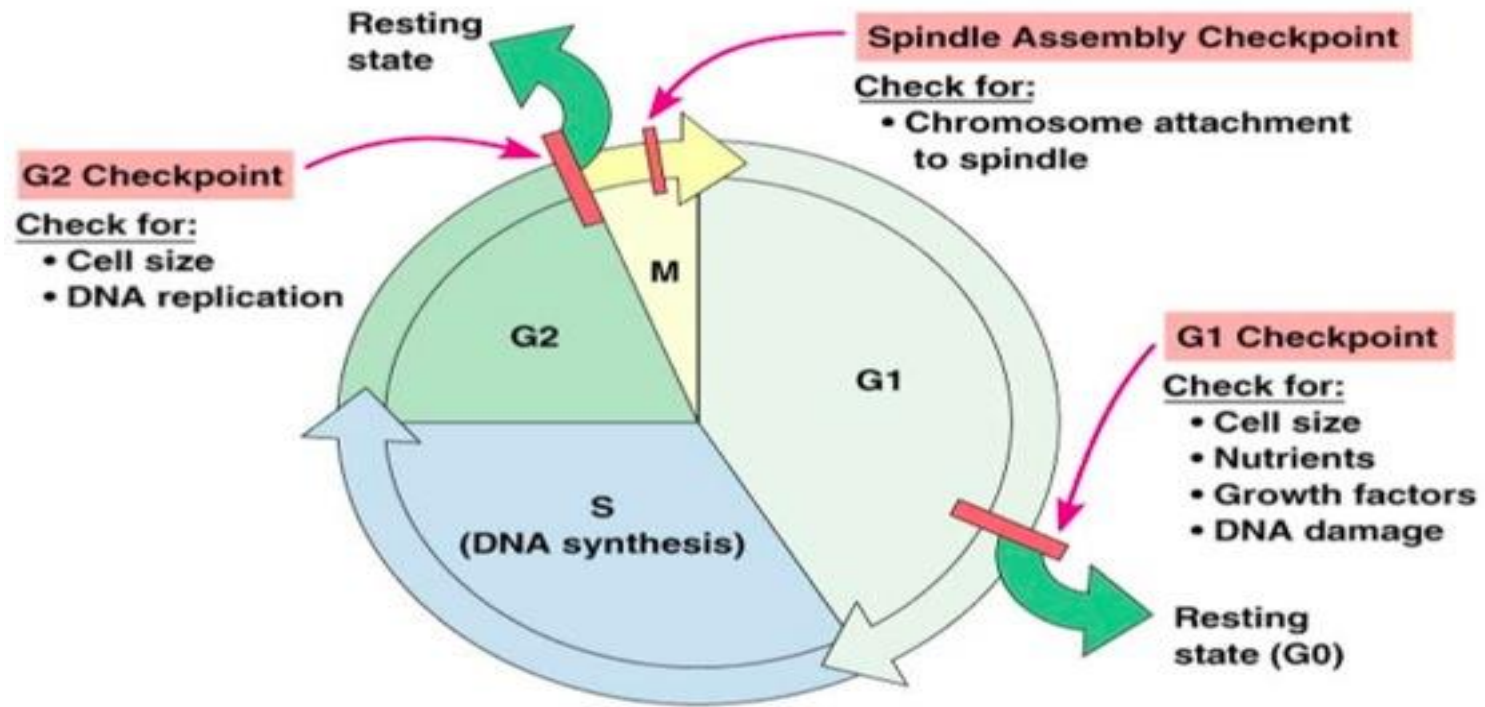


Mitosis and  
cell plate formation in a  
flattened endosperm cell  
of the African blood lily,  
*Haemanthus katherinae*,  
observed with  
phase contrast microscopy

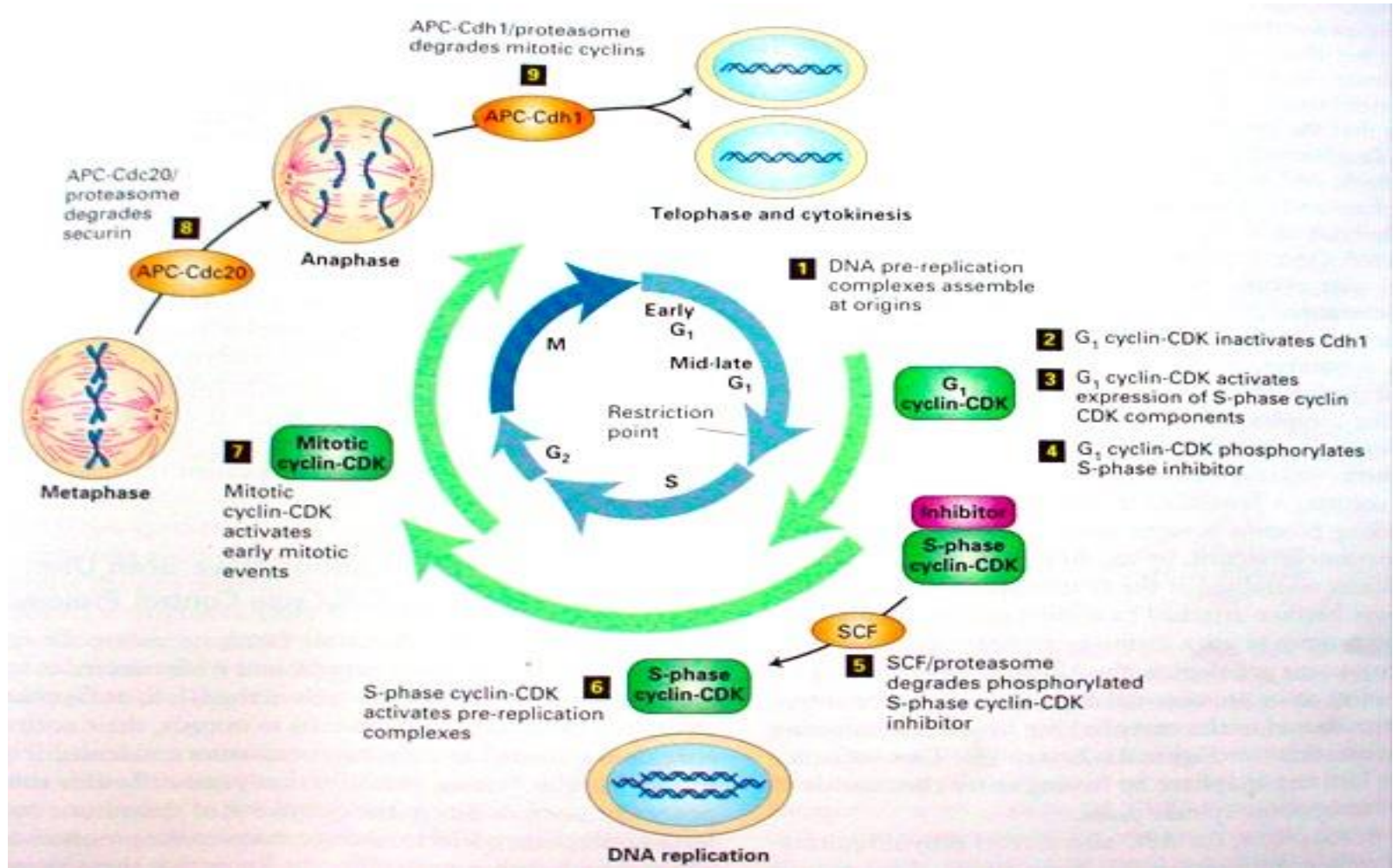
# Ciclina Cinasas

▪ **KdC o quinasa (cinasa) dependiente de ciclina.** Las quinasas agregan un grupo fosfato a las proteínas. Las **kdk** junto con **ciclina** son los mayores controladores del ciclo celular, provocando que la célula pase de G1 a S o de G2 a M.

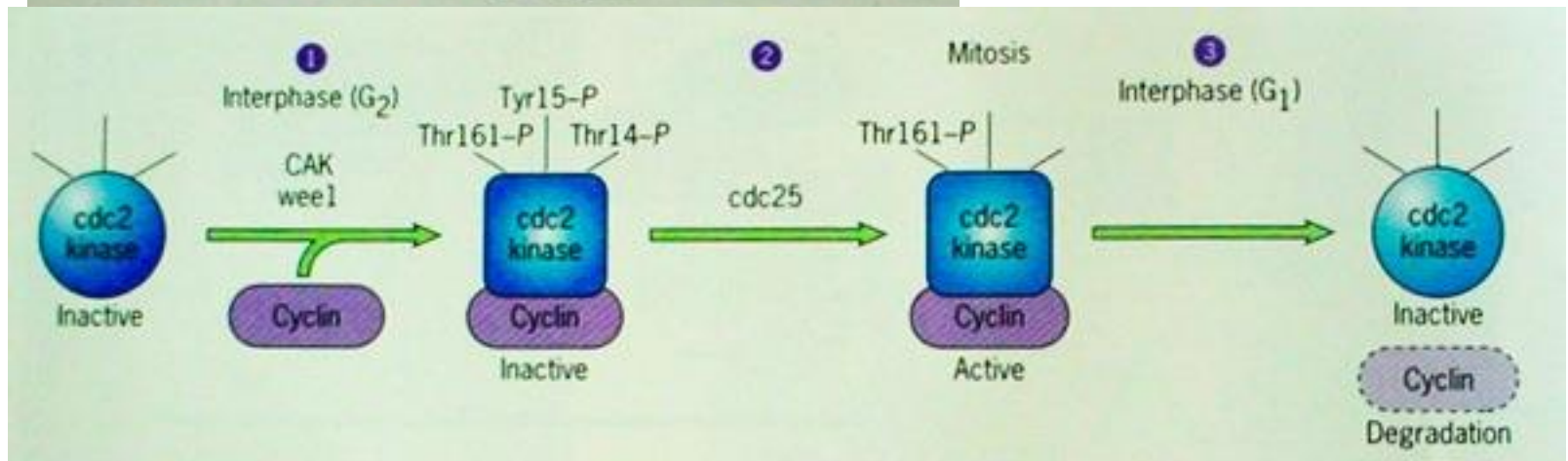
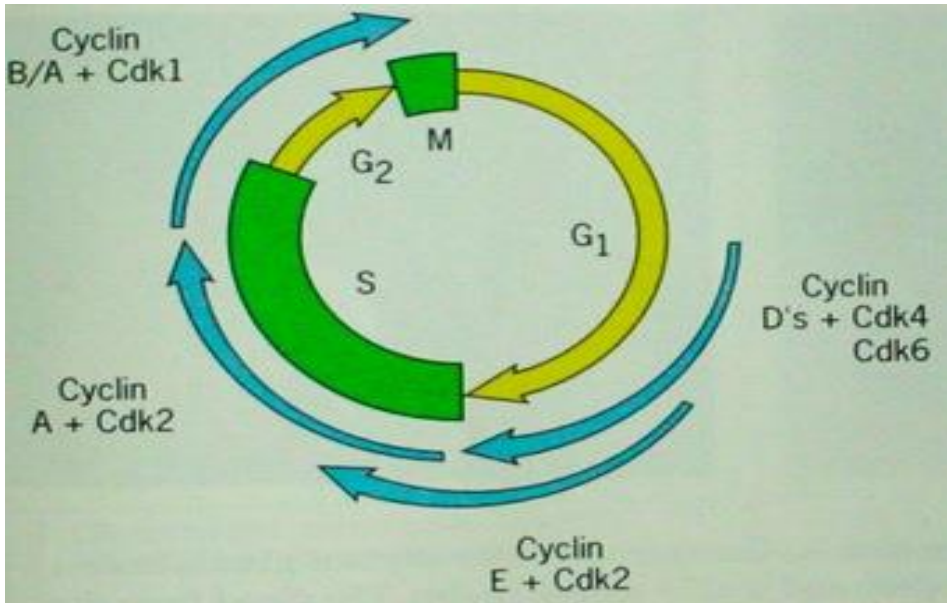
▪ **FPM o Factor Promotor de la Maduración:** Está formado por la KdC y las ciclina que desencadenan la progresión del ciclo celular.



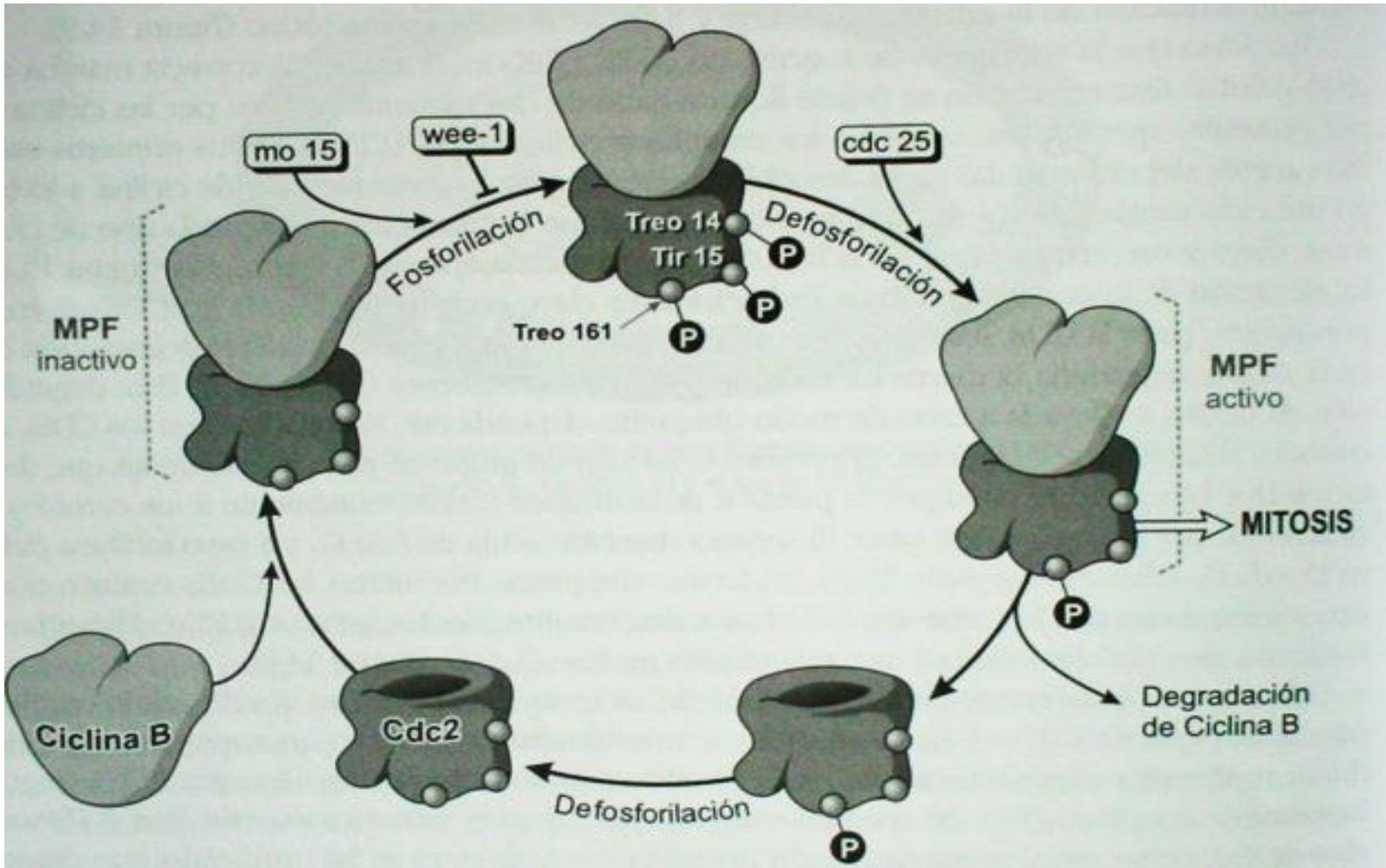
# Generalidades de las Cinasas



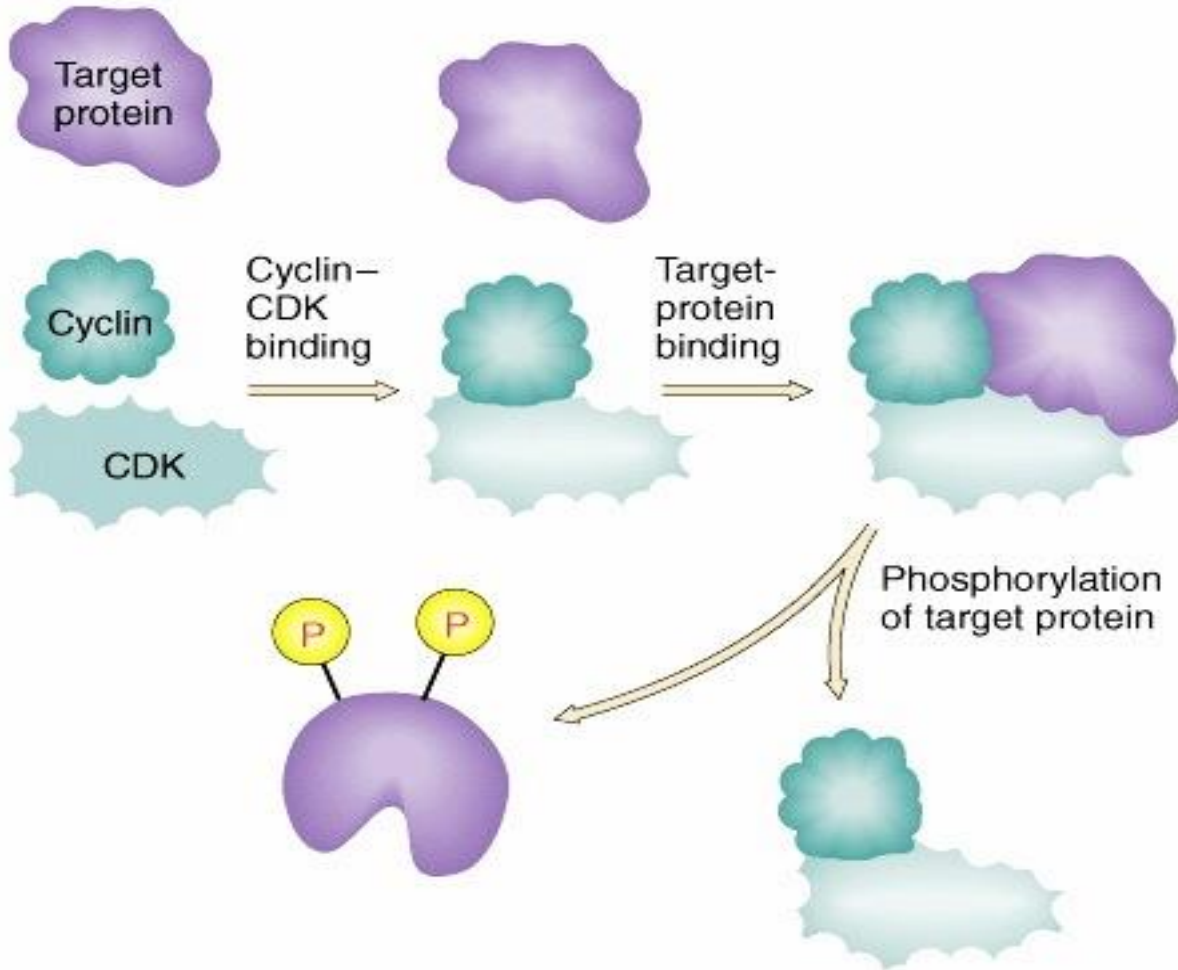
# Ciclina en el ciclo



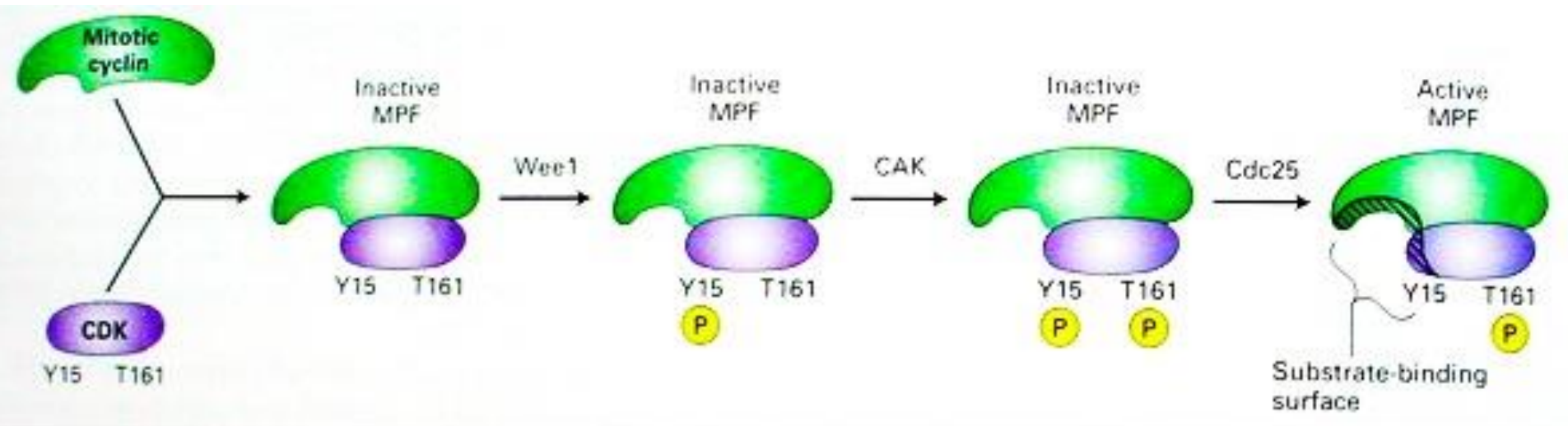
# Fosforilación

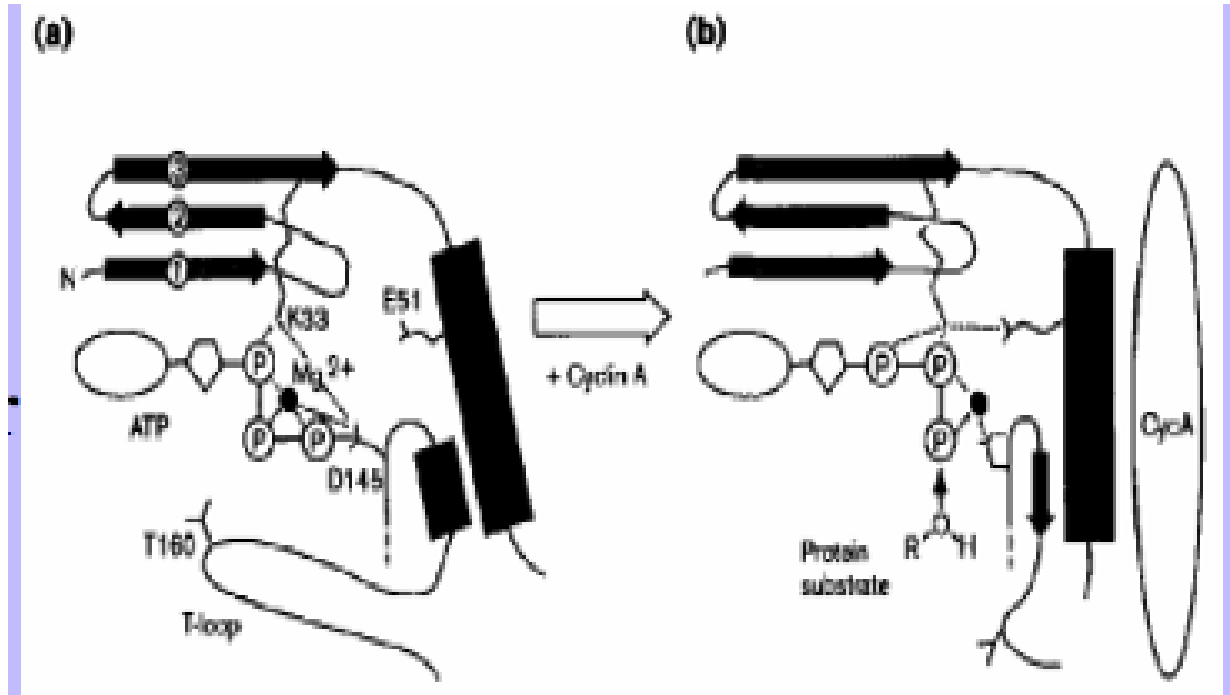






# Factor promotor de la Mitosis (MPF)





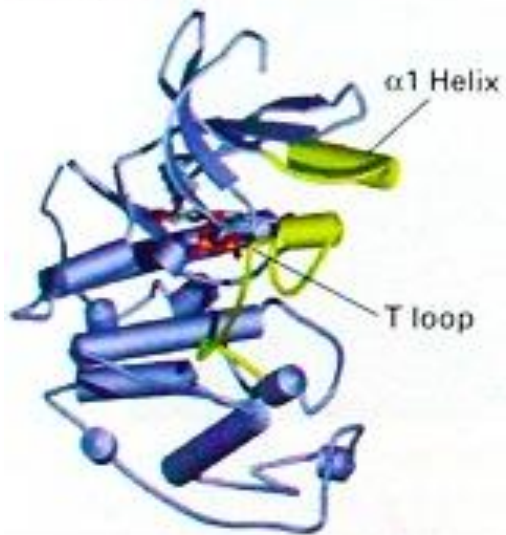
Activación parcial con las ciclinas

Fosforilación con CDK

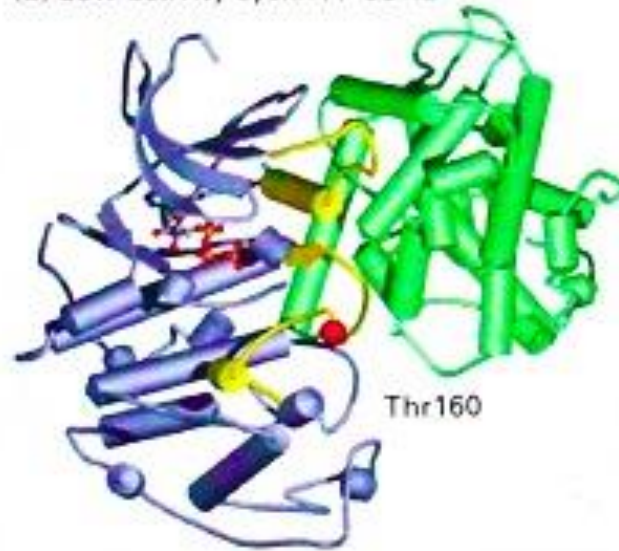


# CDK

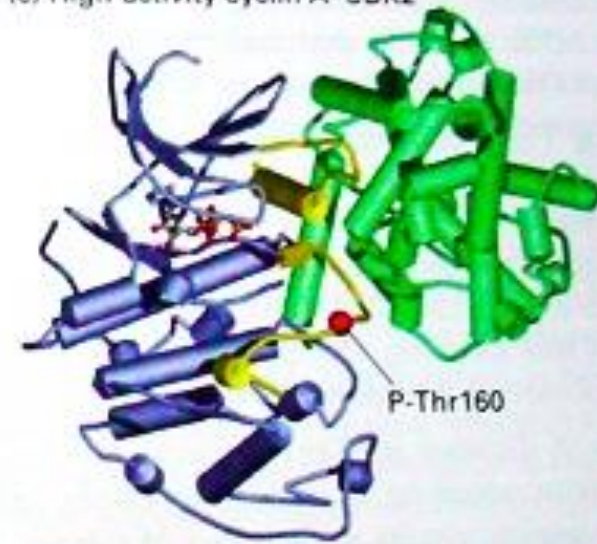
(a) Free CDK2



(b) Low-activity cyclin A-CDK2



(c) High-activity cyclin A-CDK2



# Puntos de control

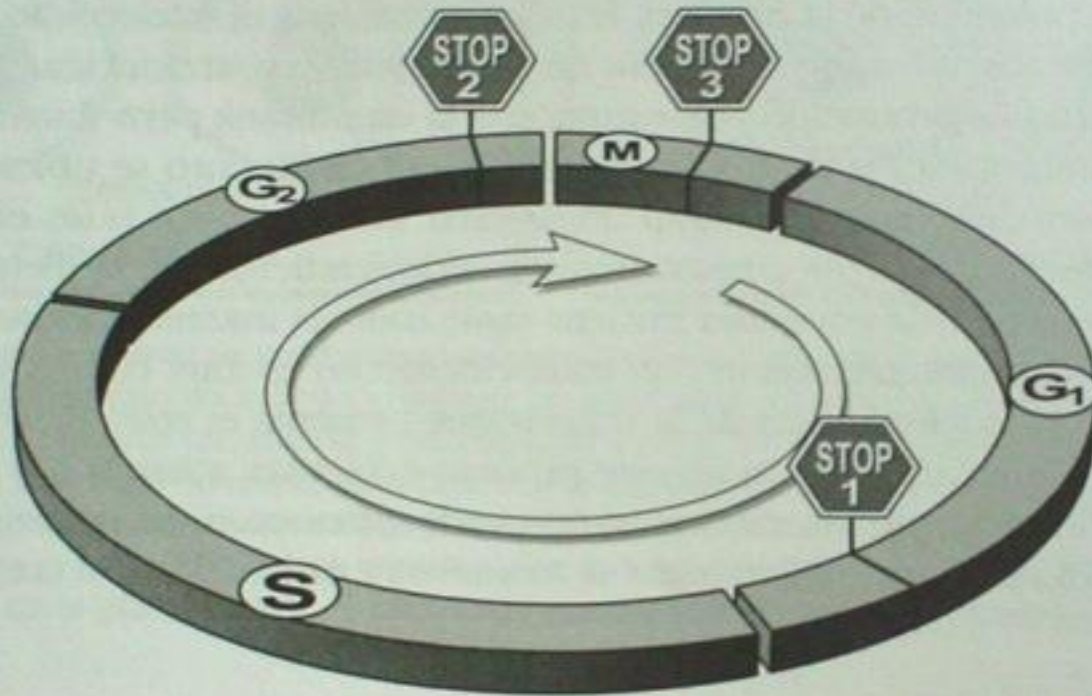
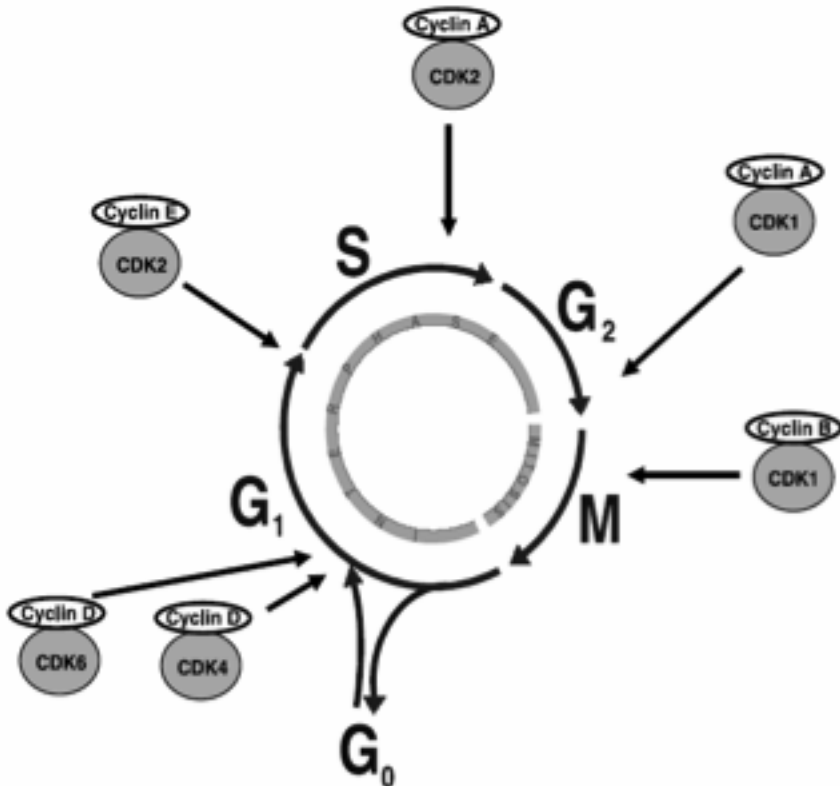


FIGURA 14.7. Puntos de control del ciclo celular. Existen tres puntos: el punto R (Stop 1), el punto G<sub>2</sub>-M (Stop 2) y el punto M (Stop 3).

# Cinastas



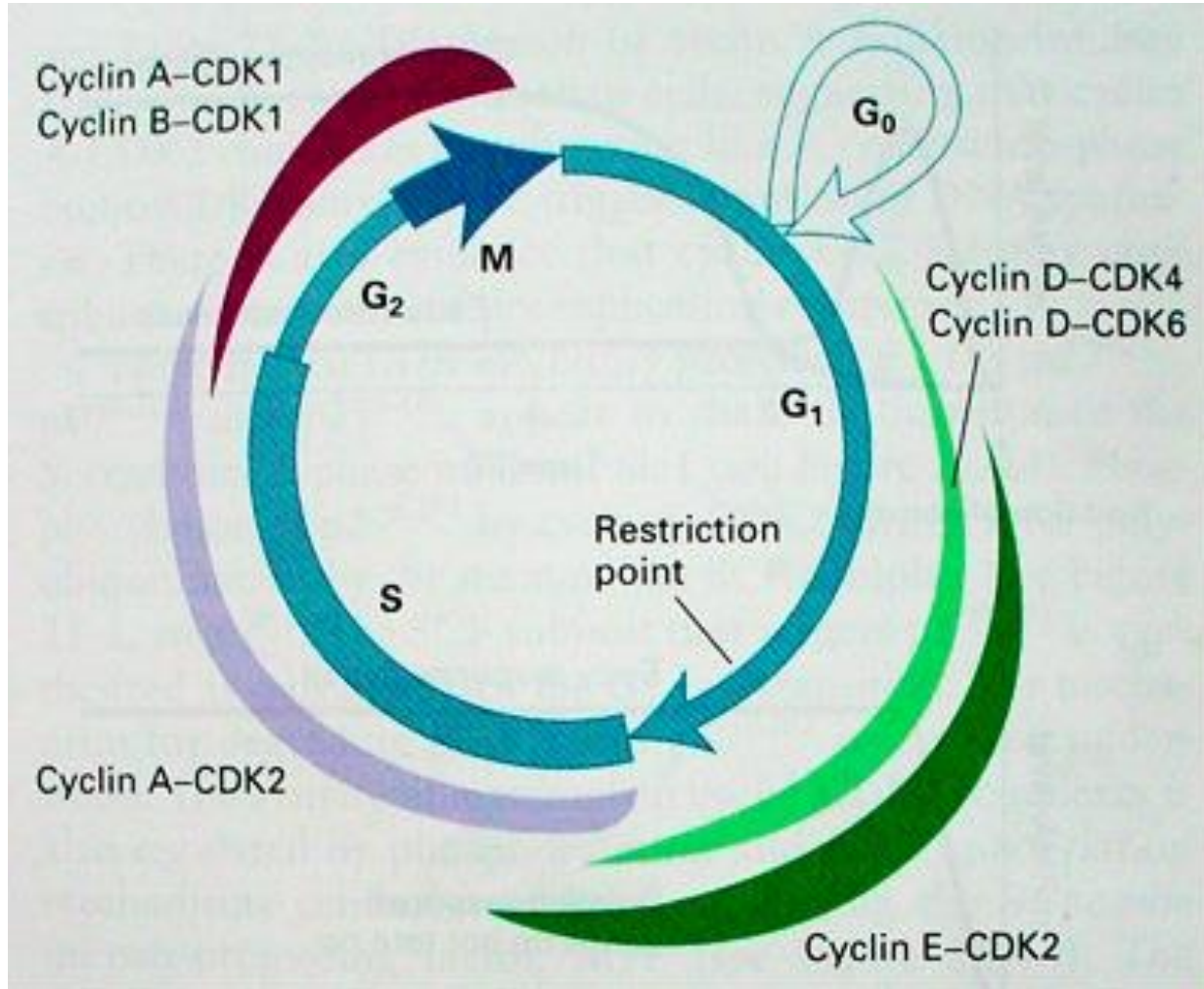
**TABLE 21-1** Selected Cyclins and Cyclin-Dependent Kinases (CDKs) \*

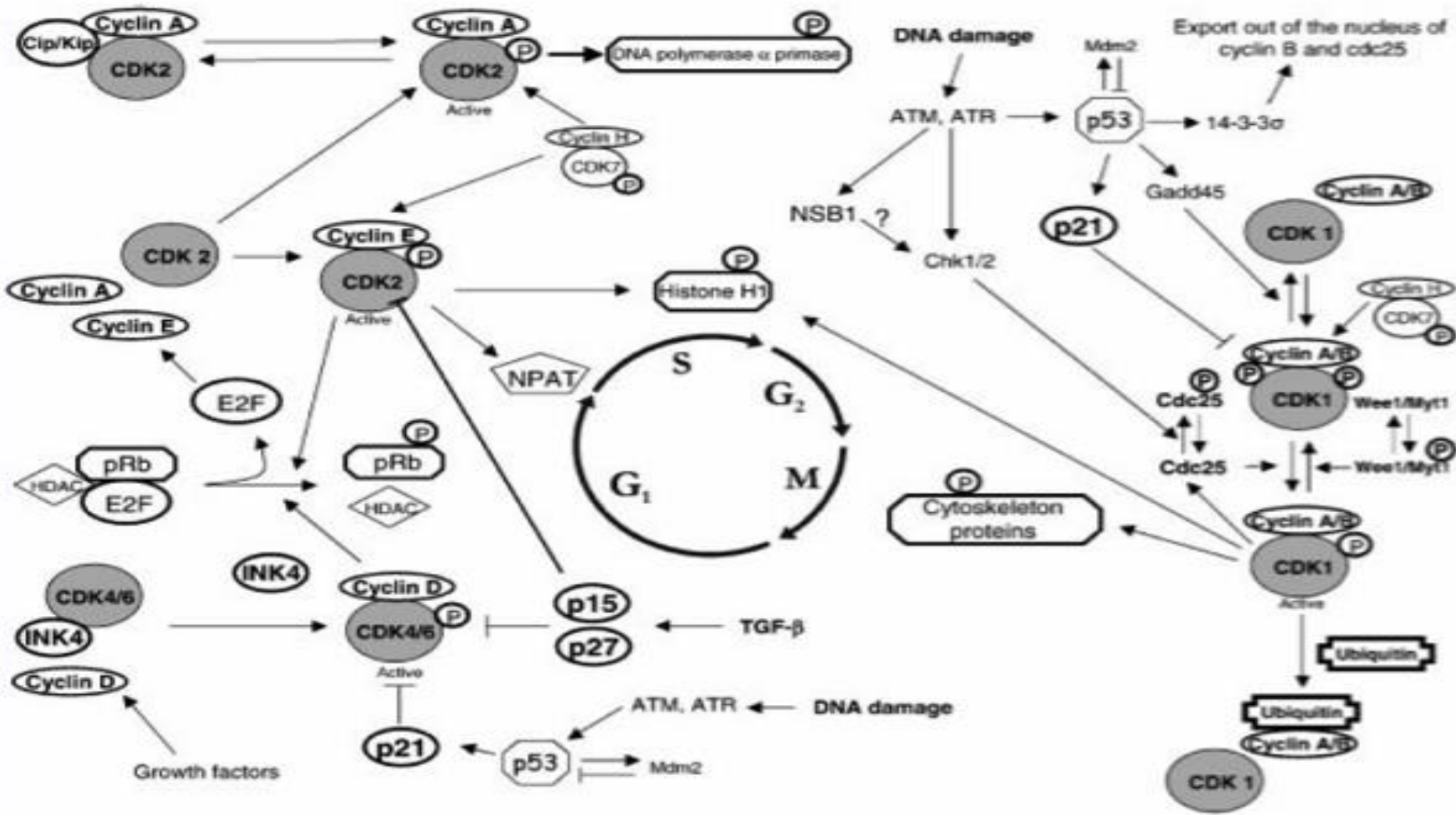
Organism/Protein	Name
<i>S. POMBE</i>	
CDK (one only)	Cdc2
Mitotic cyclin (one only)	Cdc13
<i>S. CEREVISIAE</i>	
CDK (one only)	Cdc28
Mid G <sub>1</sub> cyclin	Cln3
Late G <sub>1</sub> cyclins	Cln1, Cln2
Early S-phase cyclins	Clb5, Clb6
Late S-phase and early mitotic cyclins	Clb3, Clb4
Late mitotic cyclins	Clb1, Clb2
VERTEBRATES	
Mid G <sub>1</sub> CDKs	CDK4, CDK6
Late G <sub>1</sub> and S-phase CDK	CDK2
Mitotic CDK	CDK1
Mid G <sub>1</sub> cyclins	D-type cyclins
Late G <sub>1</sub> and S-phase cyclin	Cyclin E
S-phase and mitotic cyclin	Cyclin A
Mitotic cyclin	Cyclin B

\* Those cyclins and CDKs discussed in this chapter are listed and classified by the period in the cell cycle in which they function. A heterodimer composed of a mitotic cyclin and CDK is commonly referred to as a mitosis-promoting factor (MPF).

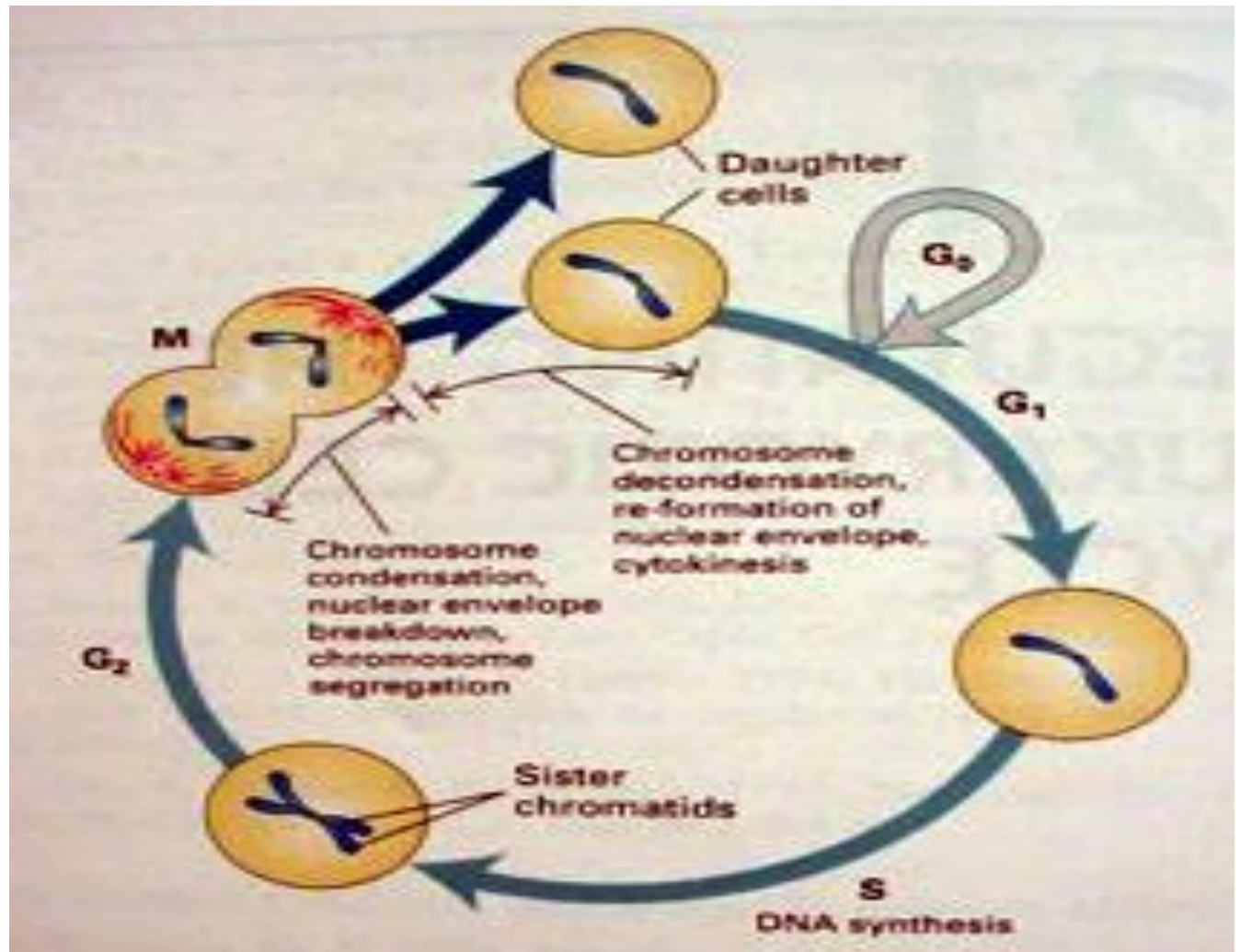


# CDK en mamíferos



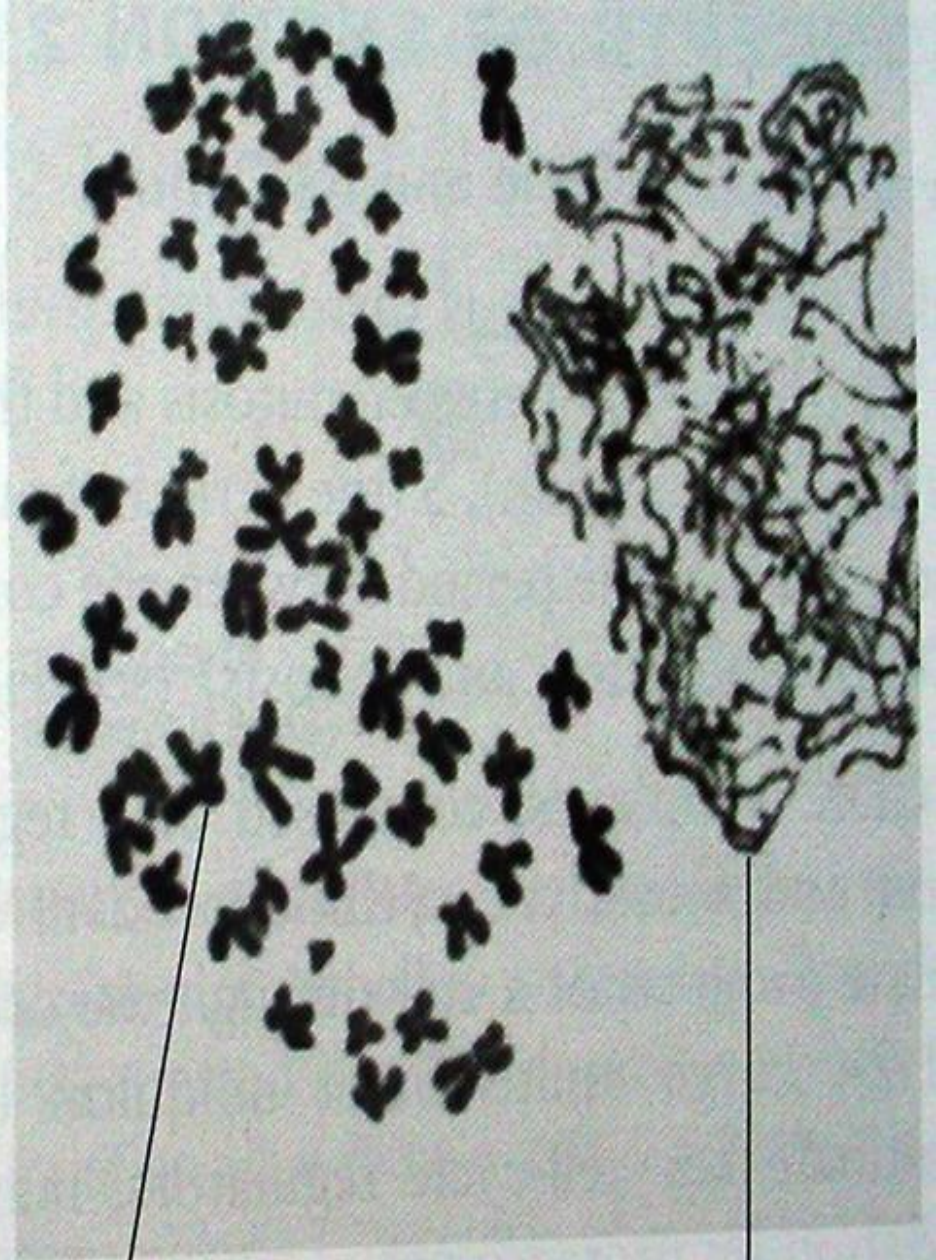


# Cromosomas





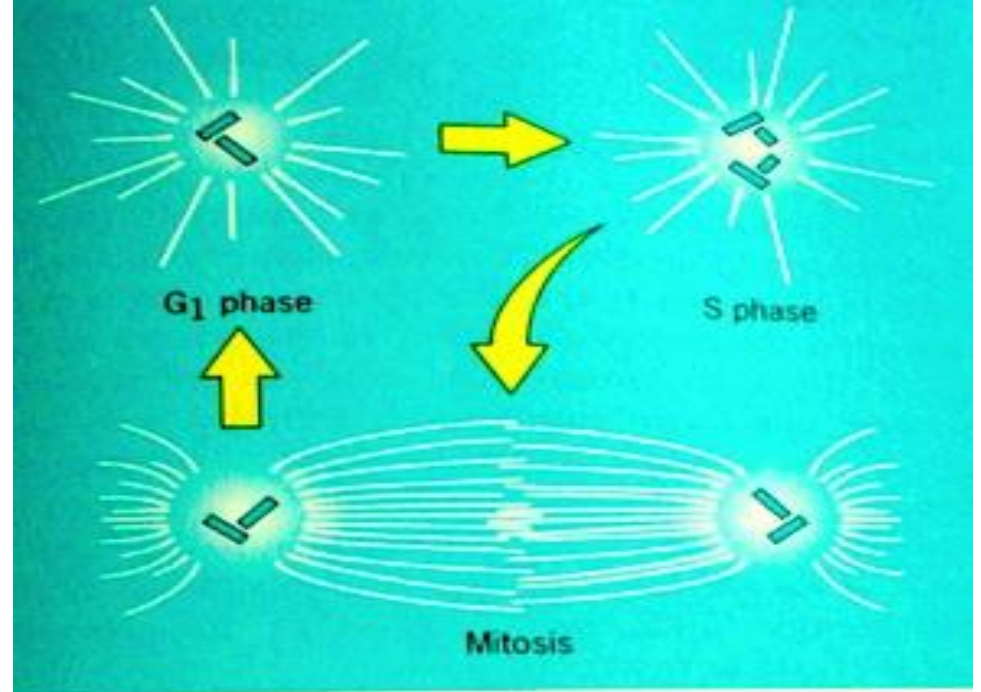
Entre  
estadios



Mitotic  
chromosomes

G<sub>1</sub> chromosomes

# Centriolos

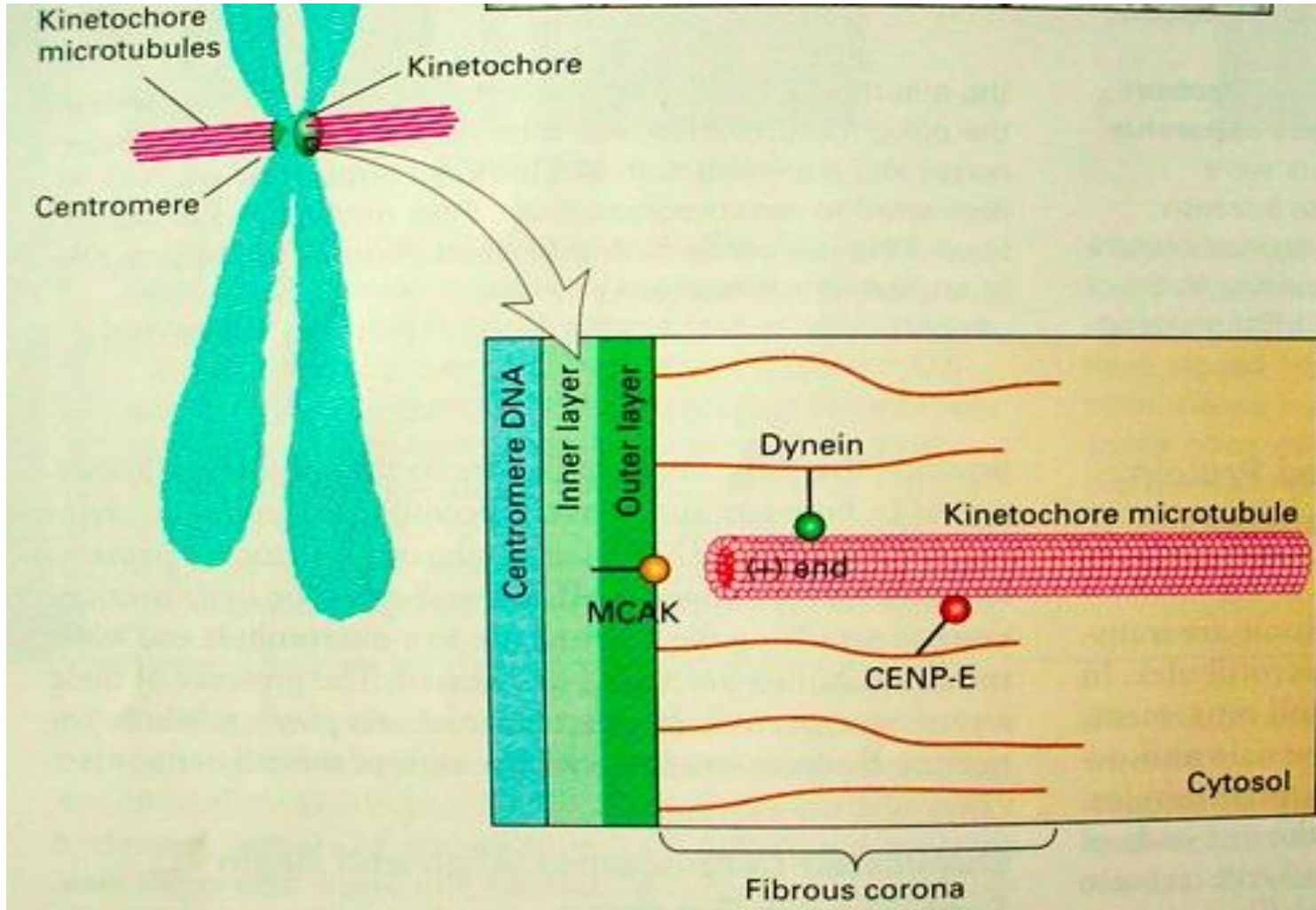


(b)

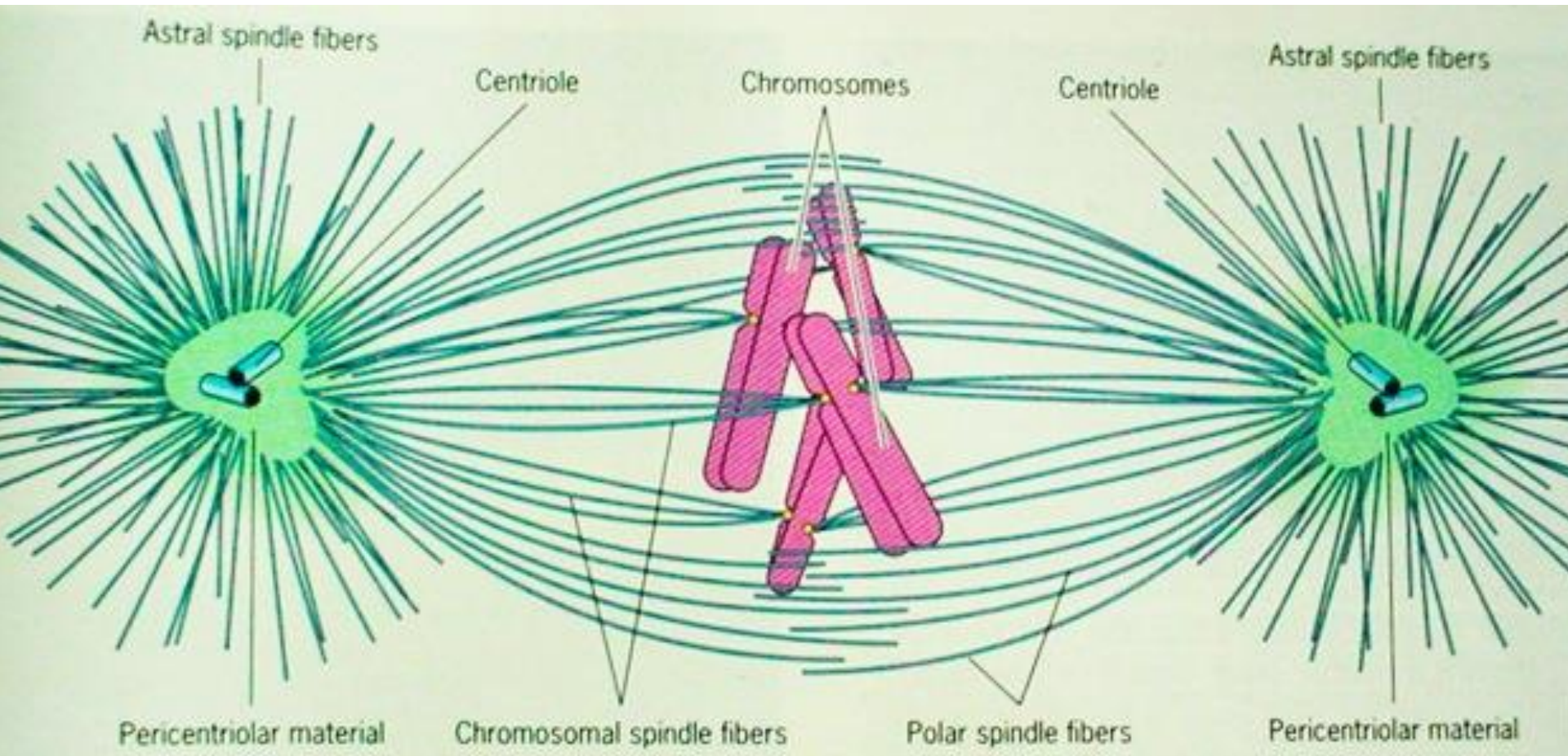
0.3 μm



# Cinetocoro

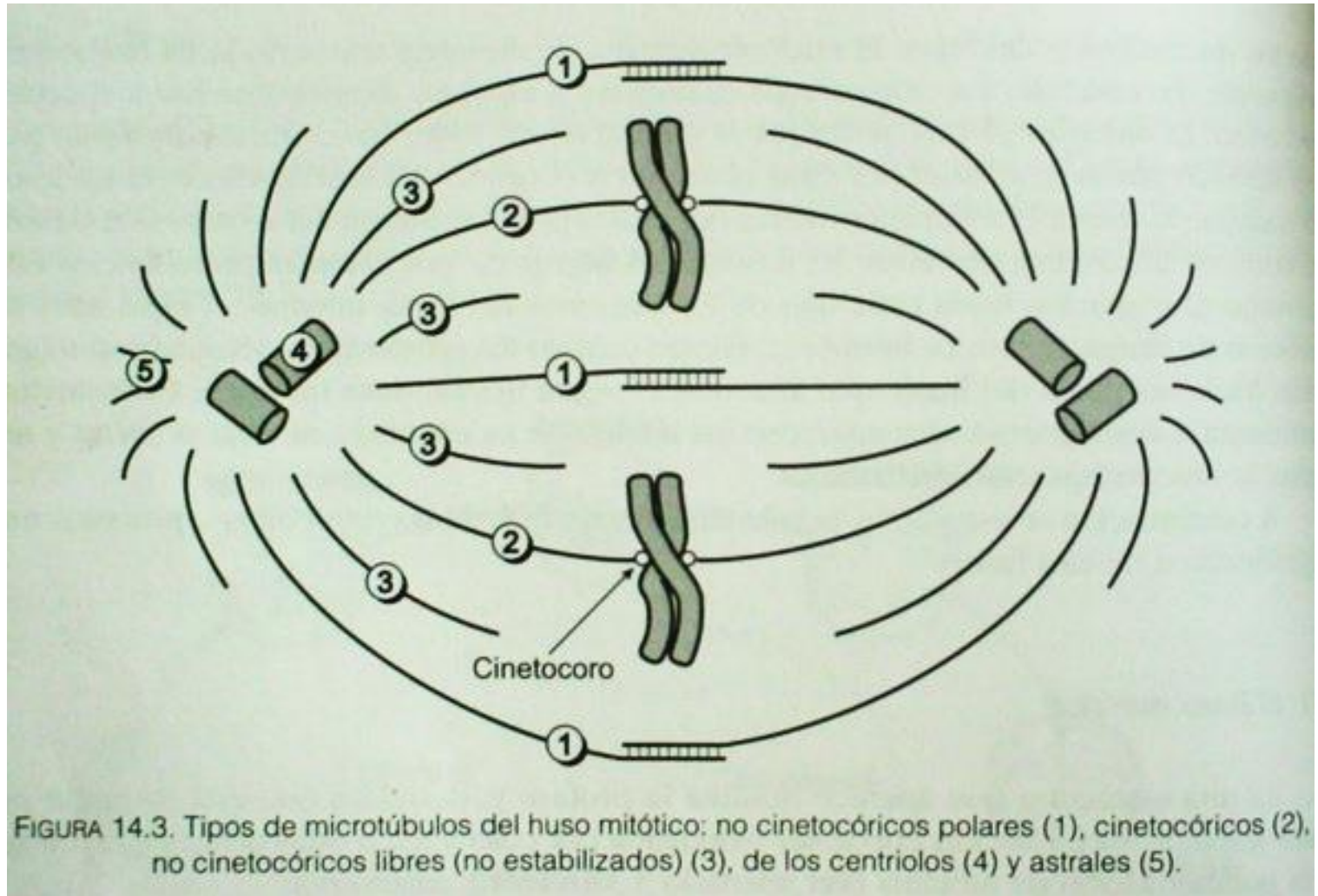


# Huso acromático

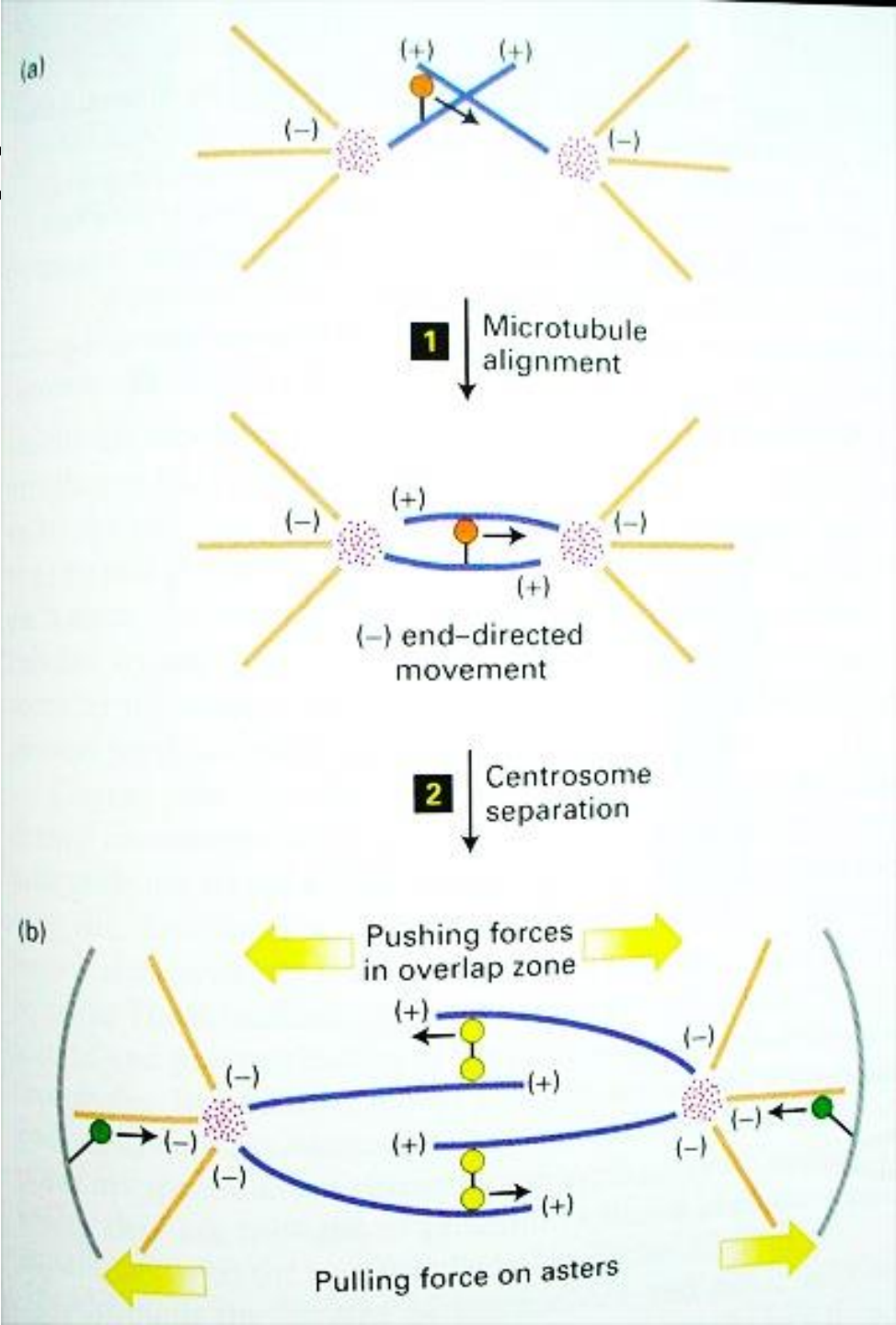
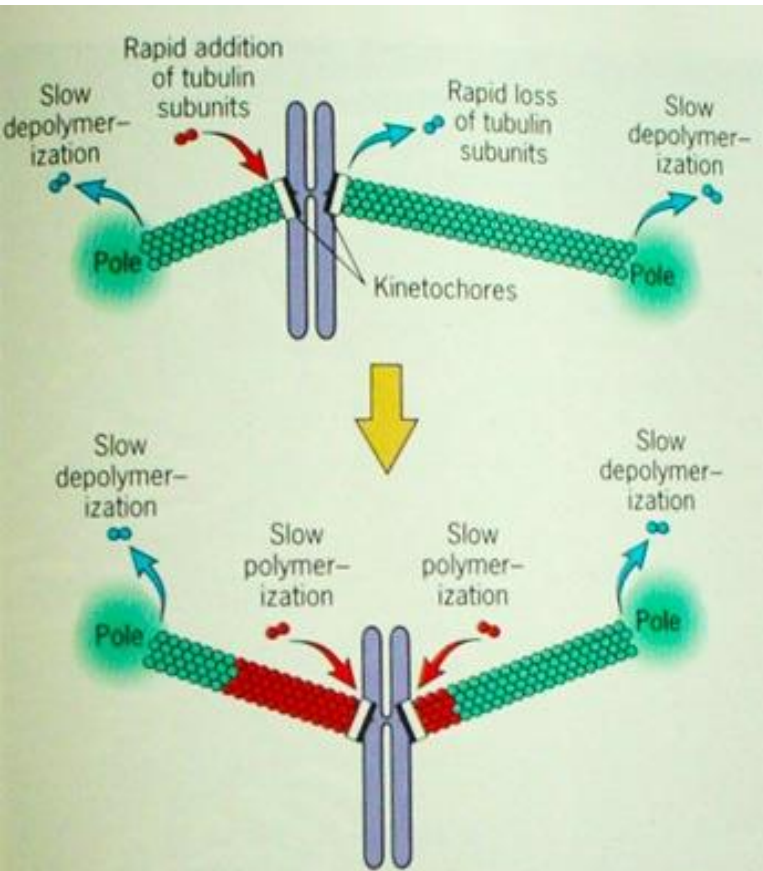




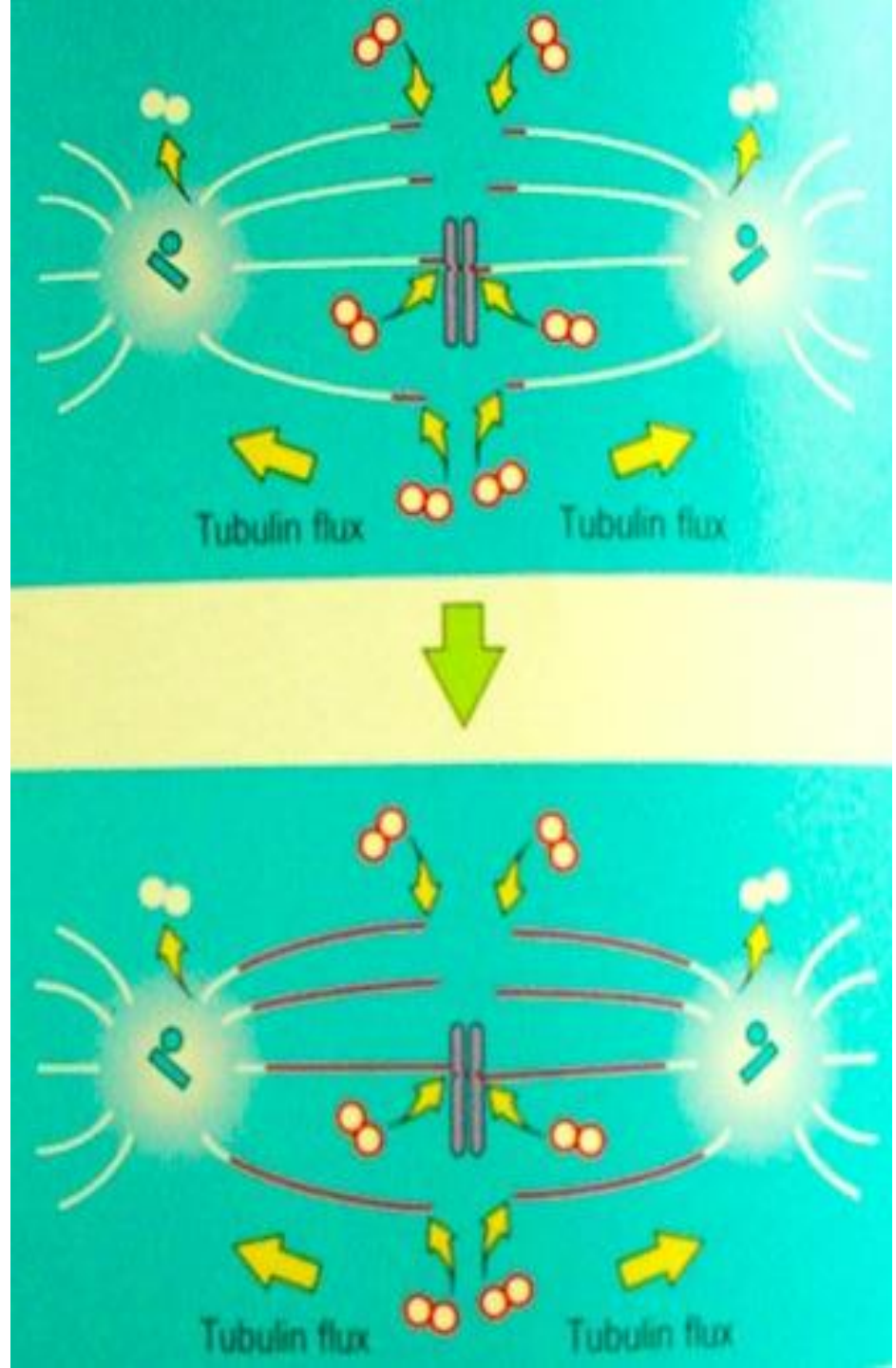
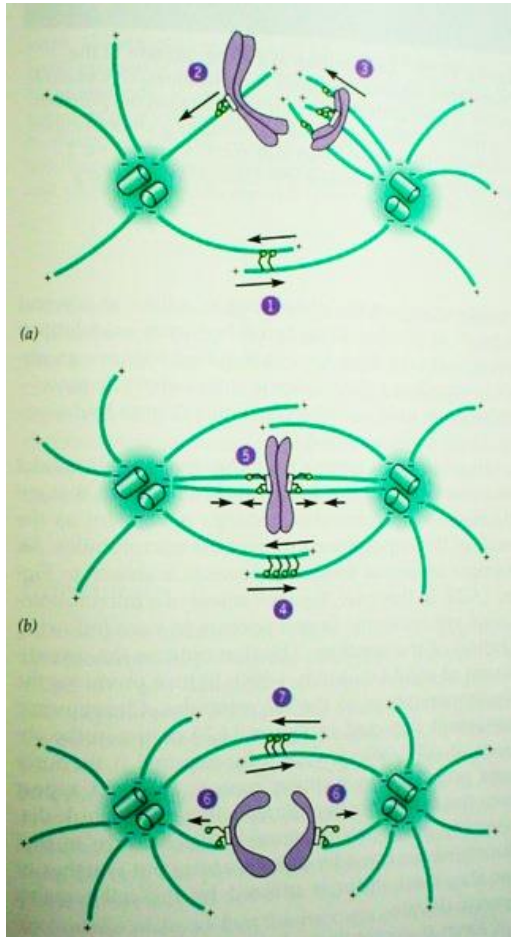
# Microtubulos



# Huso mitótico

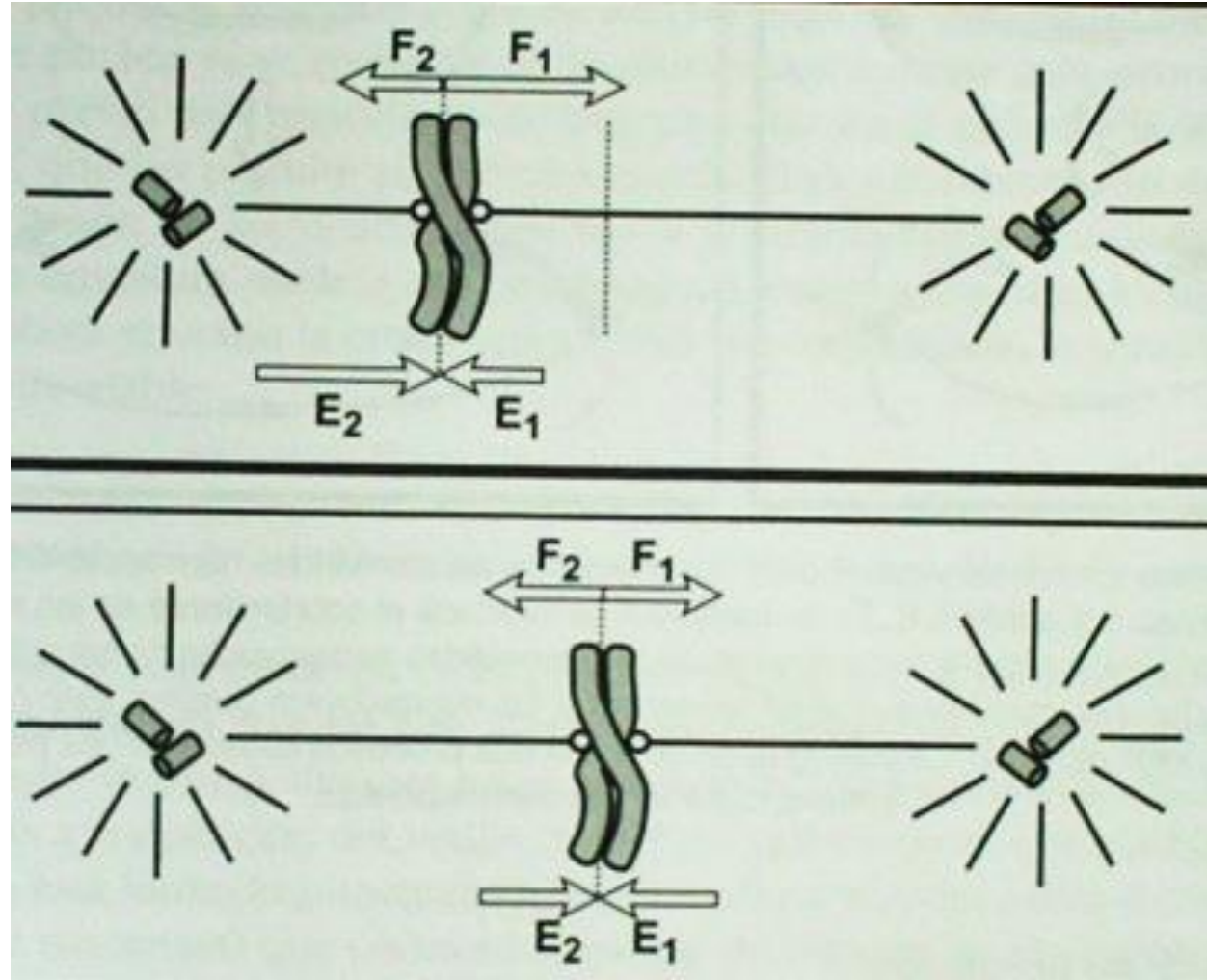
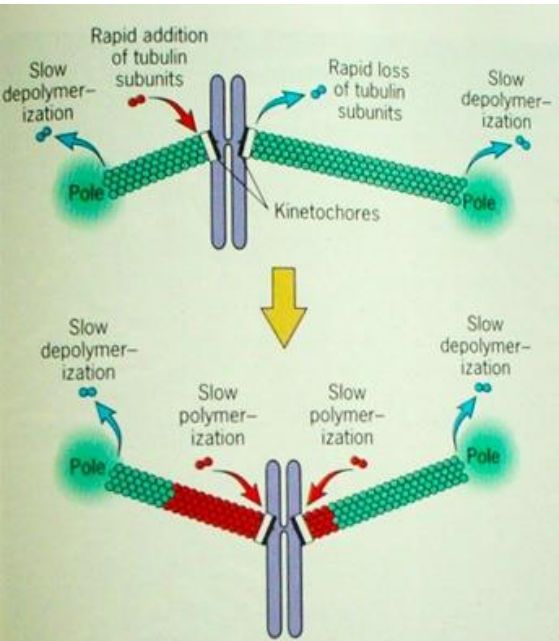


# Polimerización

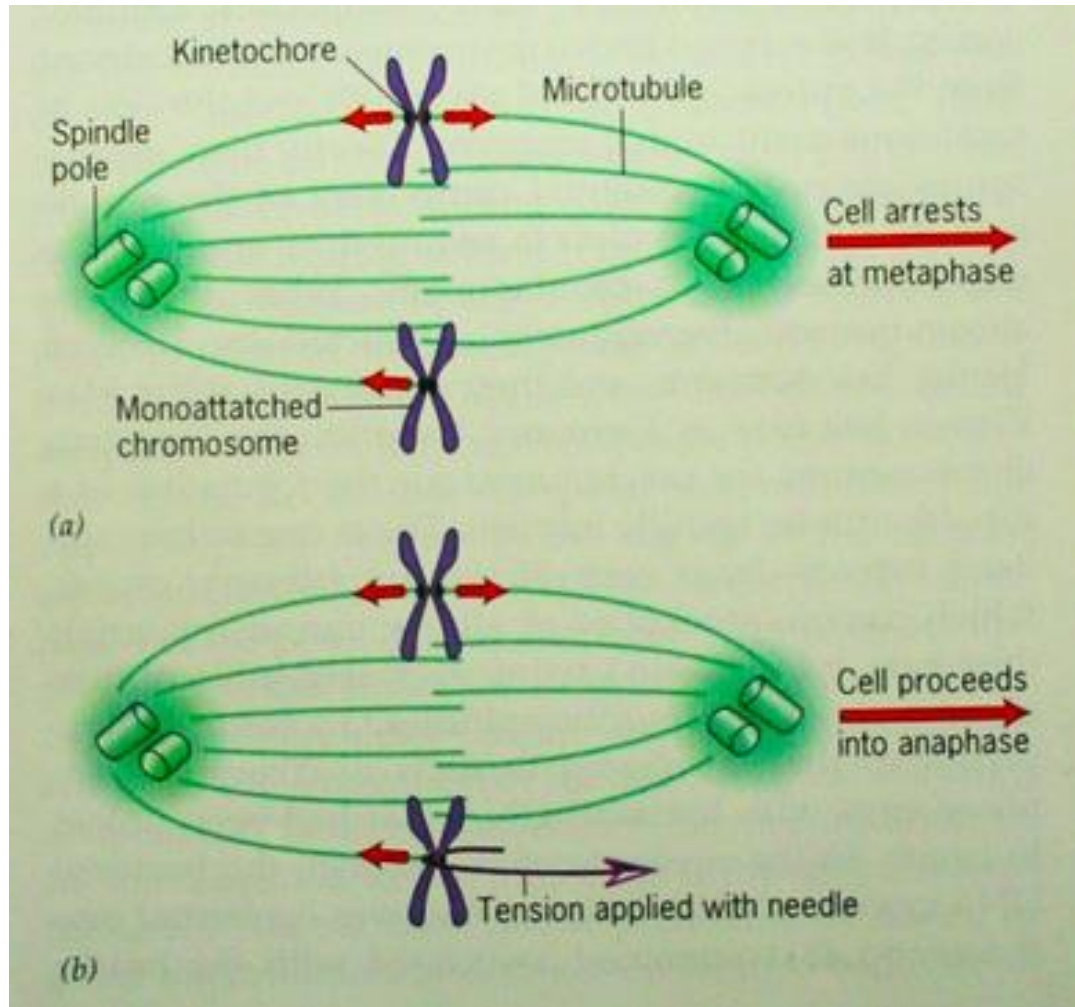




# Formación de la placa



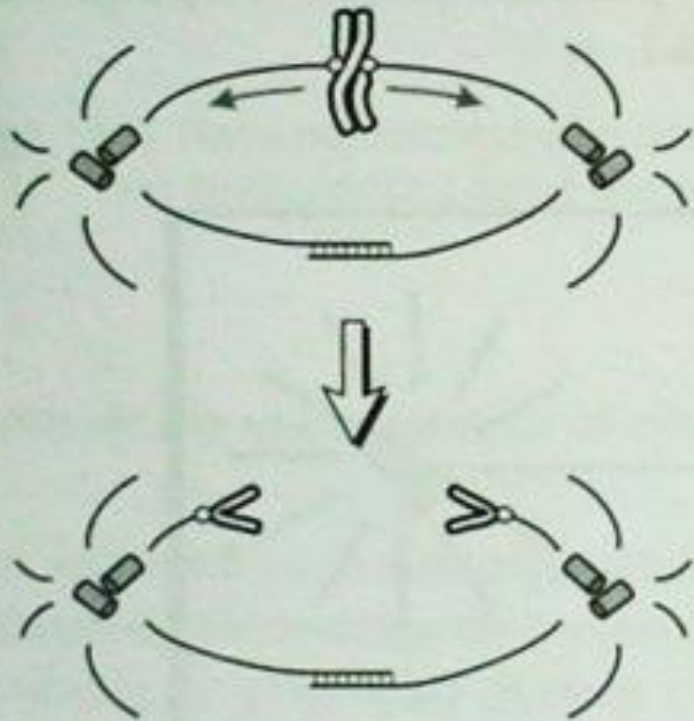
# Células arrestadas





# Separación

Anafase A



Anafase B

