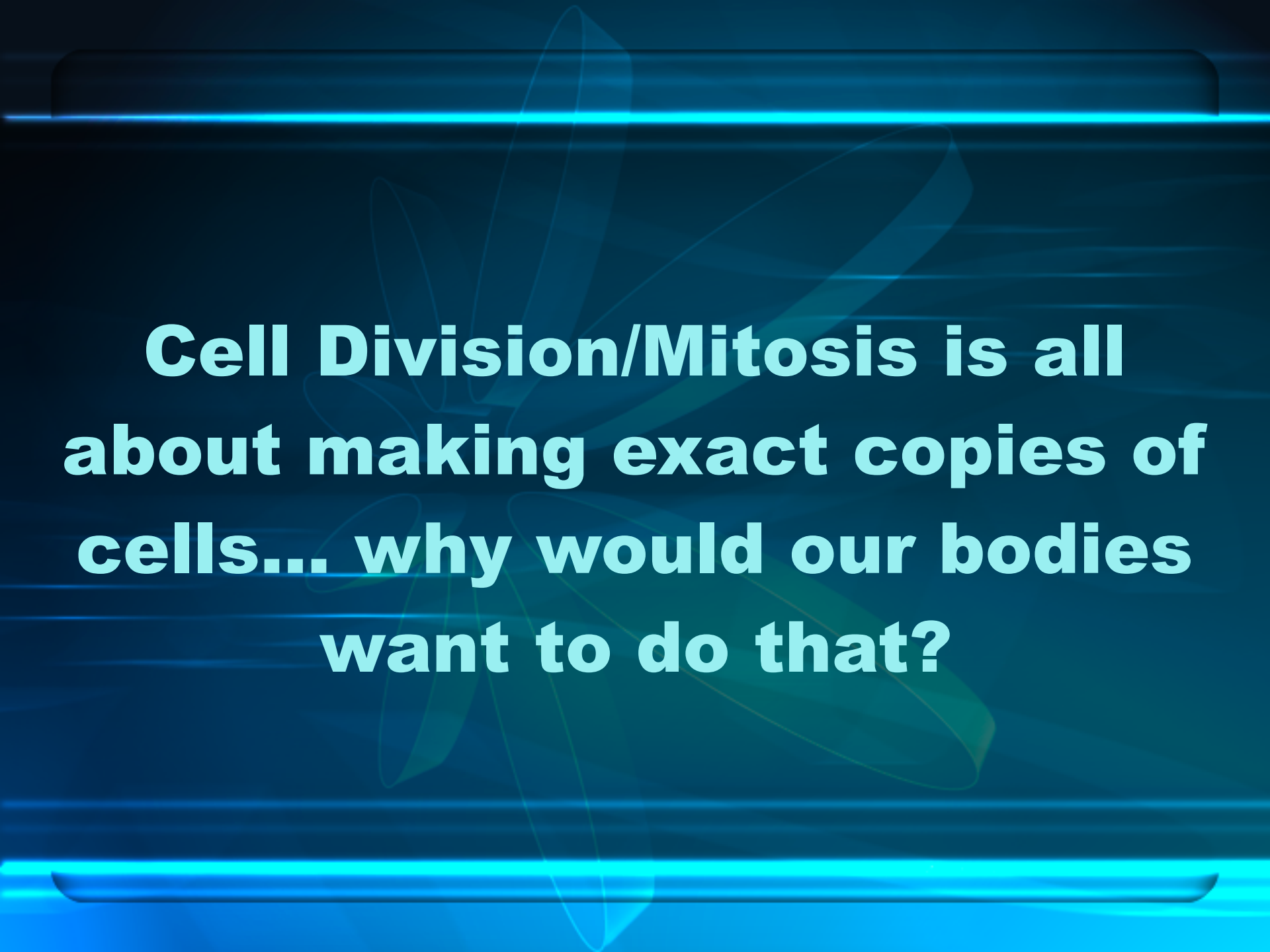




Cell Cycle/ Mitosis

Vocab Break...

- Homologous Chromosomes
- Chromosome
- Sister Chromatids
- Centromere



Cell Division/Mitosis is all about making exact copies of cells... why would our bodies want to do that?

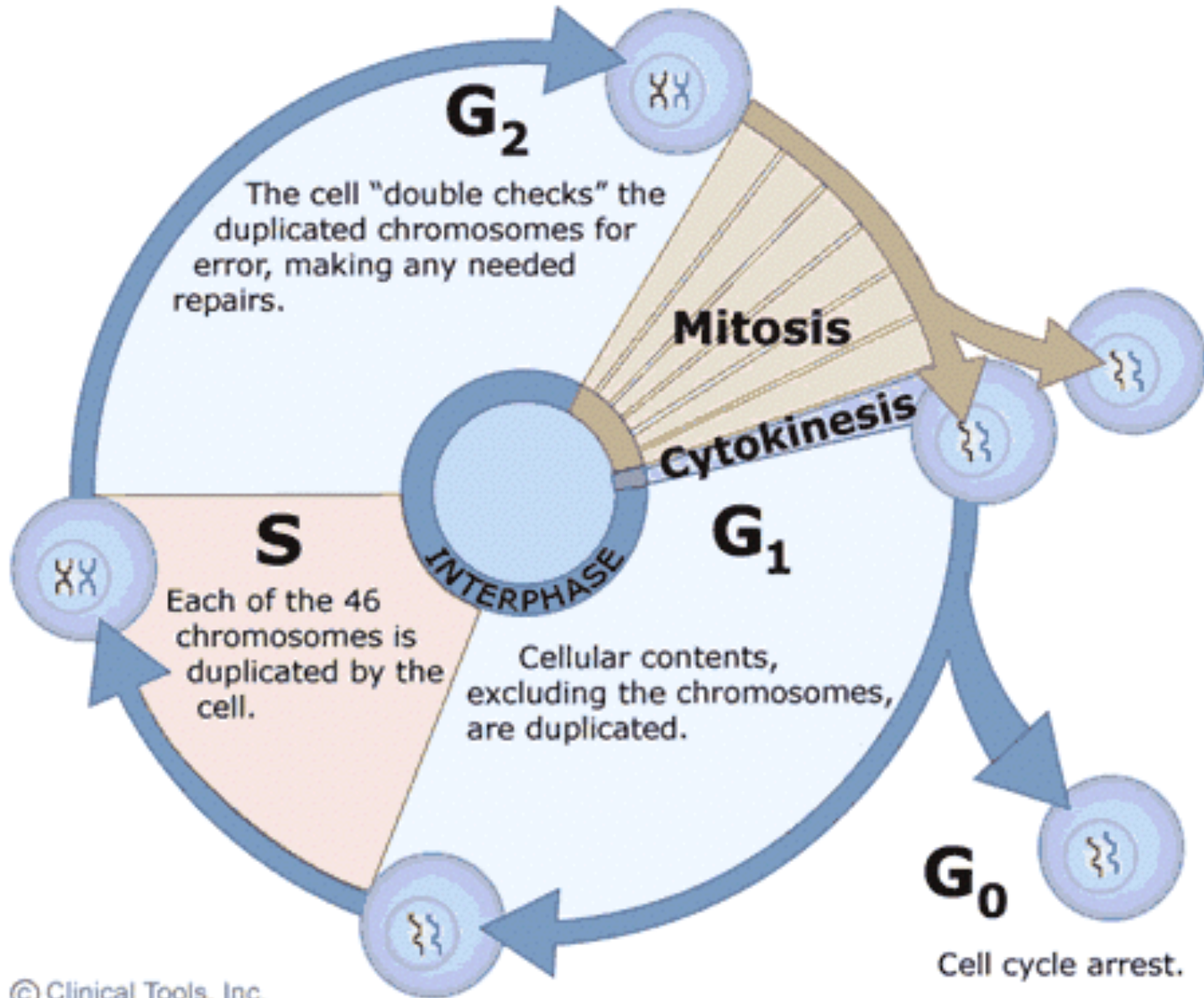
Why?

- **Cells are continually dying so new ones must continually be formed**
- **To replace damaged cells**
- **For reproduction to continue growth**
- **For reproduction in single cell organisms**

Let's start with a video...

- <http://youtu.be/VGV3fv-uZYI>

Cell Cycle



Interphase:

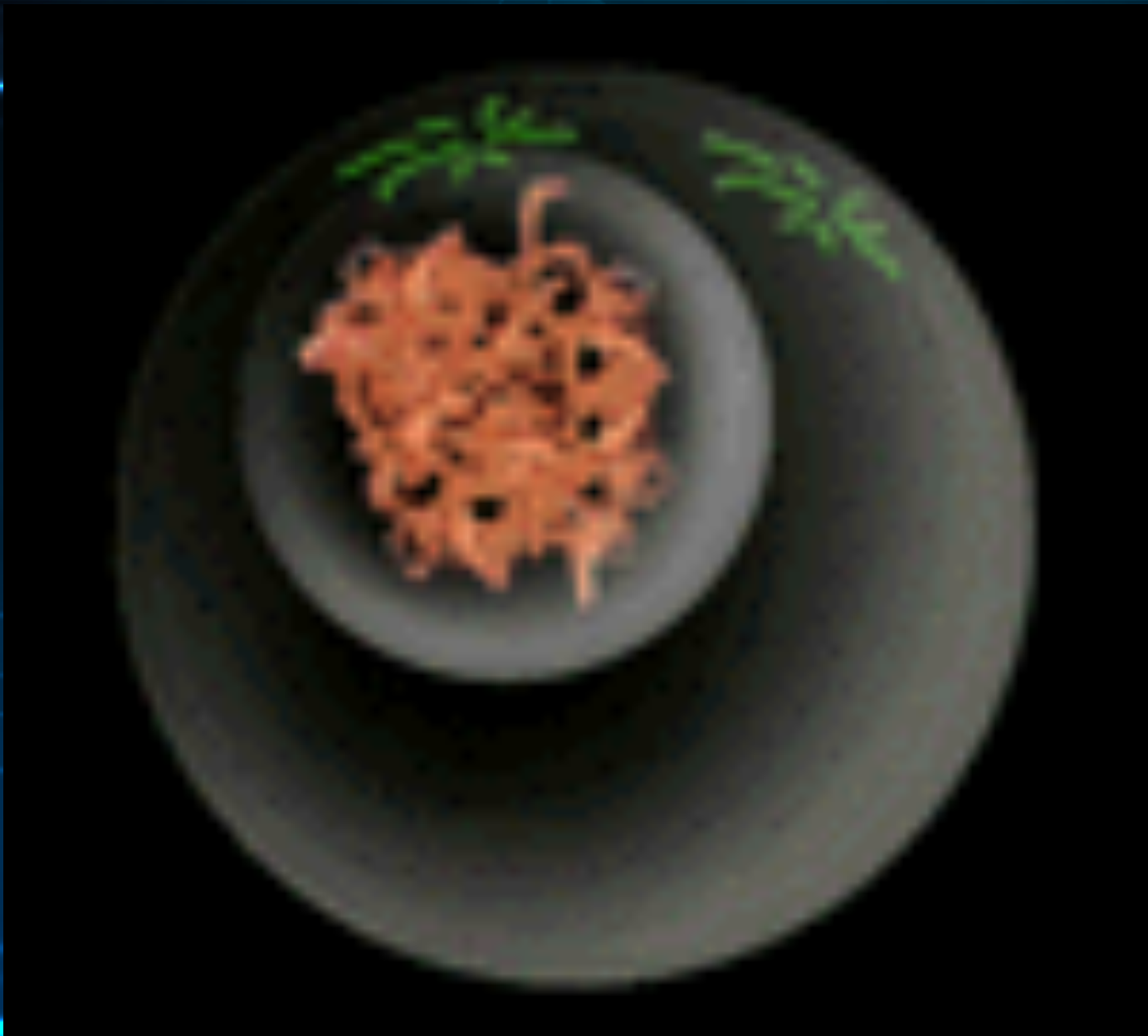
- This is the most active growth phase**
- Cells spend most of their time here**
- Divided up into 3 stages**

G1: Everything in the cell except for the chromosomes is duplicated

S: Each of the 46 chromosomes are duplicated, DNA is replicated (copied)

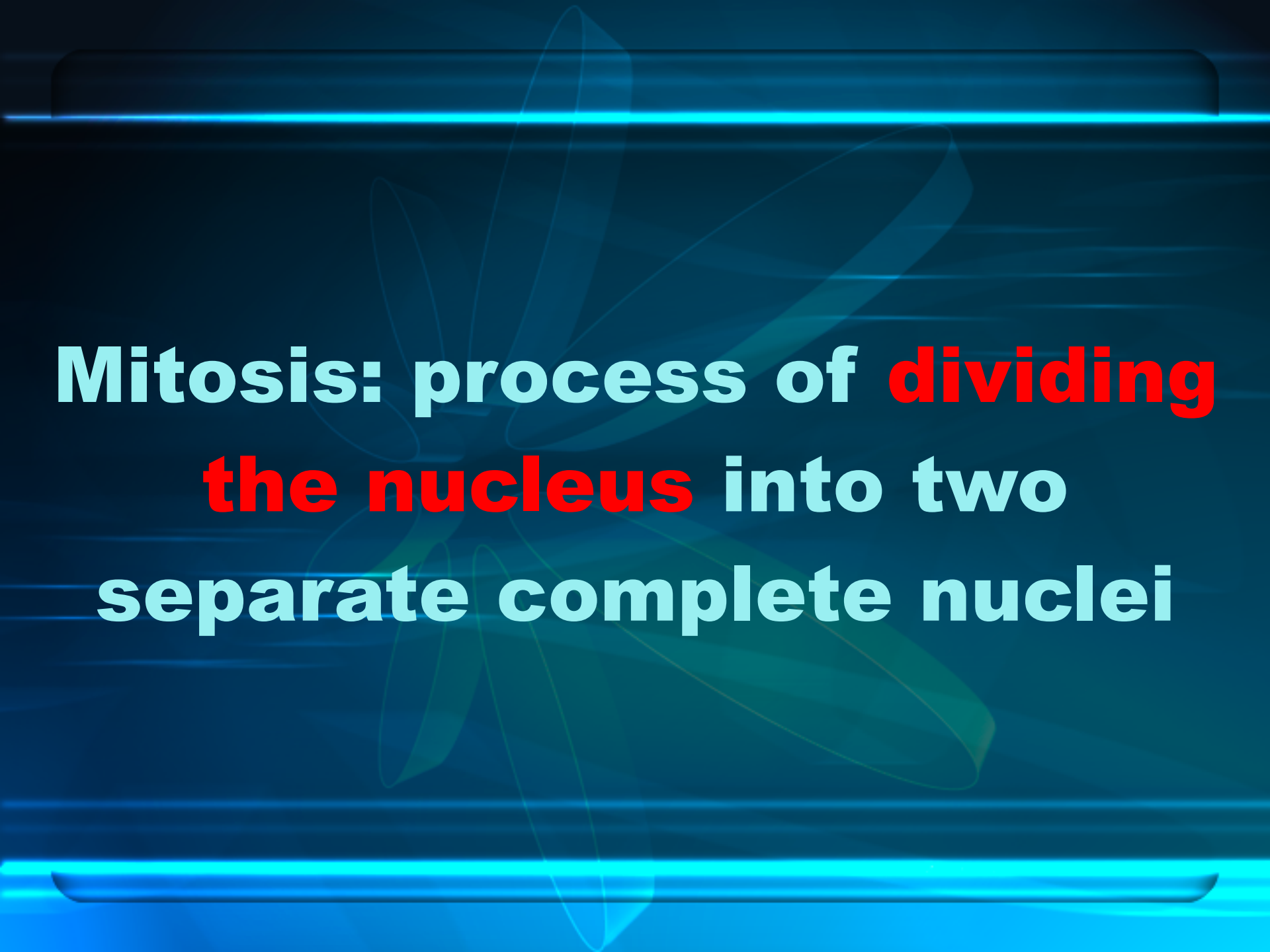
G2: Cell checks to make sure everything is ready

- If something goes wrong cells should stop at this point and either not divide or undergo apoptosis





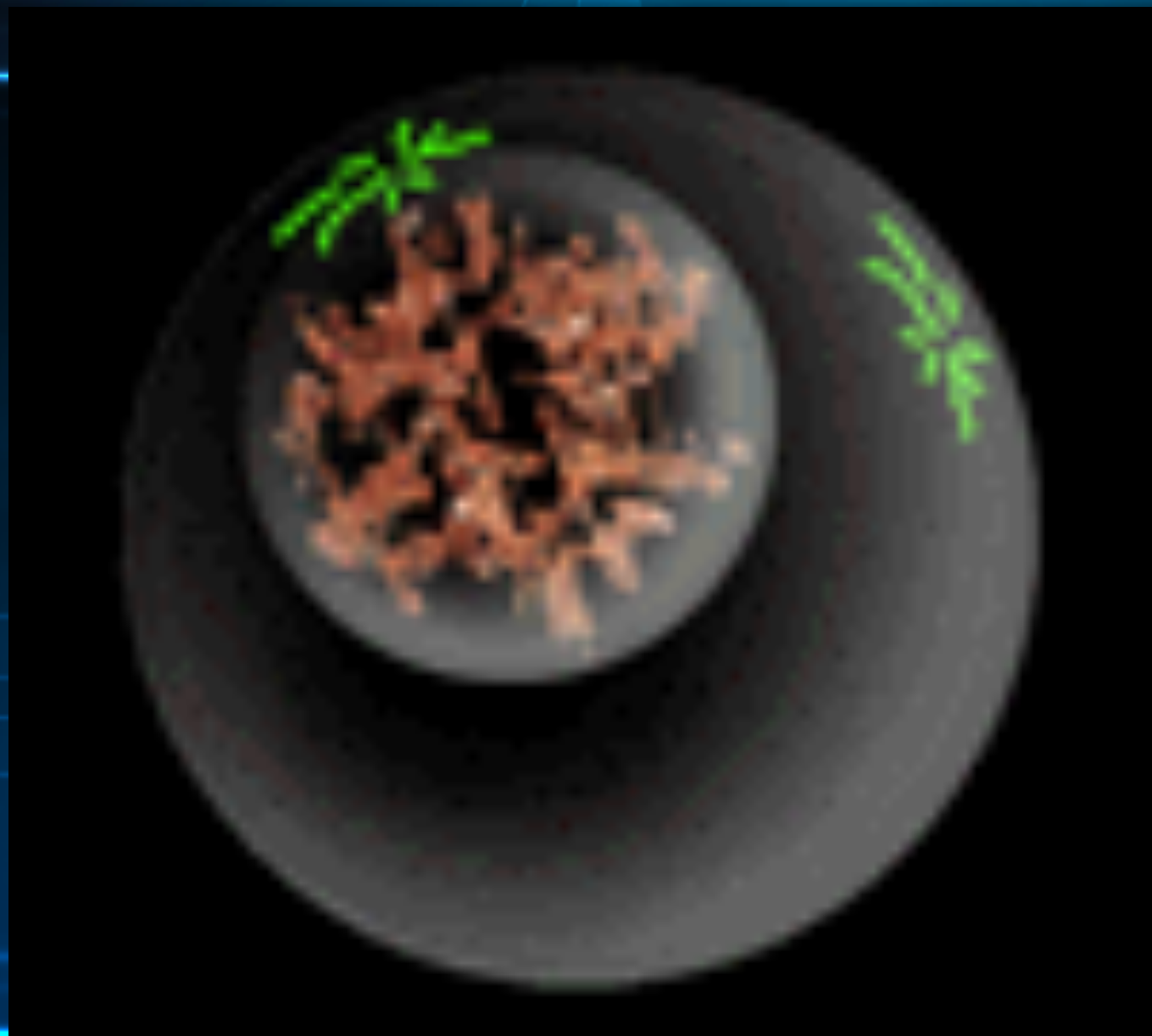
Mitosis Begins



**Mitosis: process of dividing
the nucleus into two
separate complete nuclei**

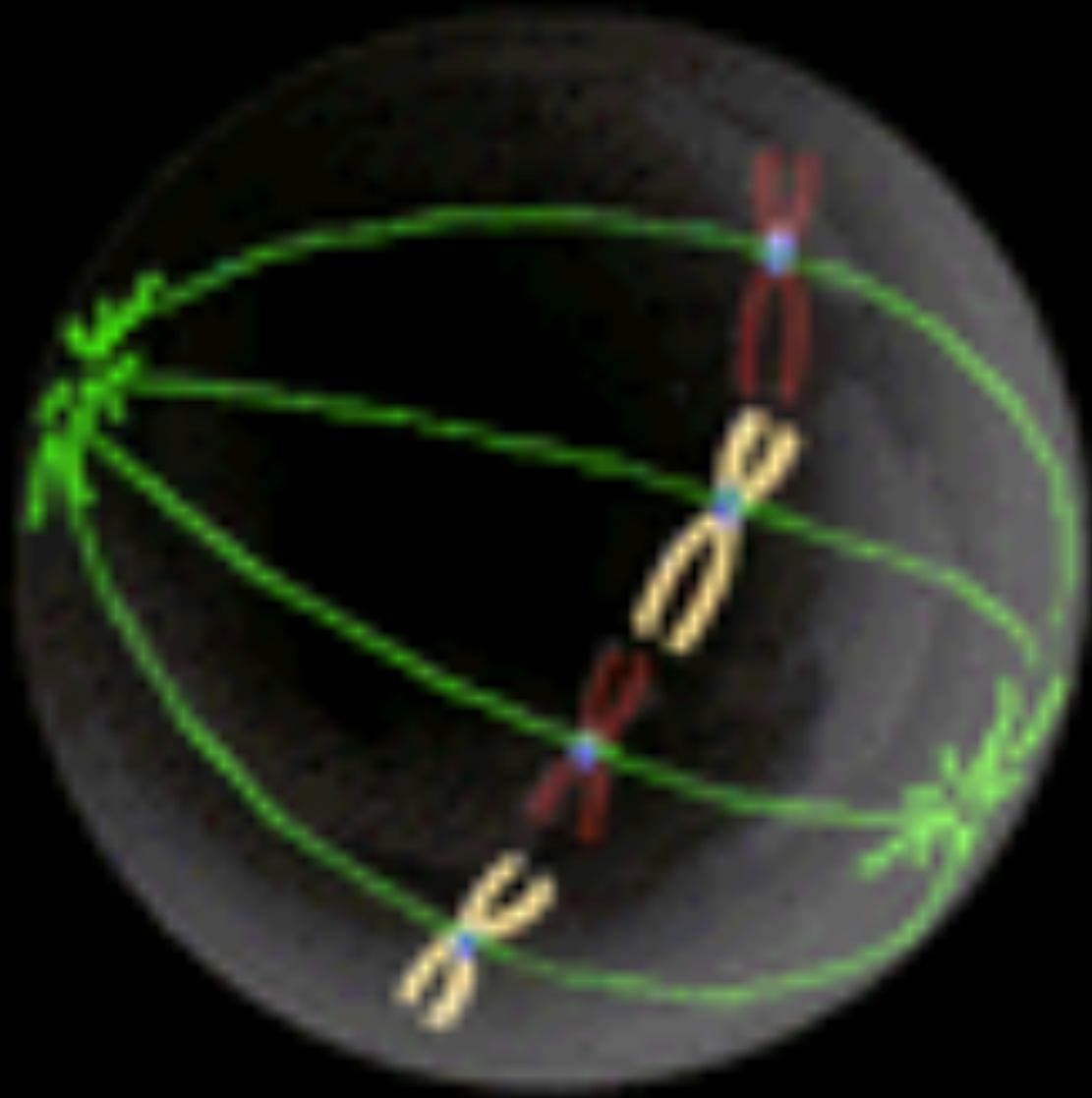
Prophase:

- DNA and proteins coil into chromosomes
- Nuclear envelope breaks down
- Spindle fibers form



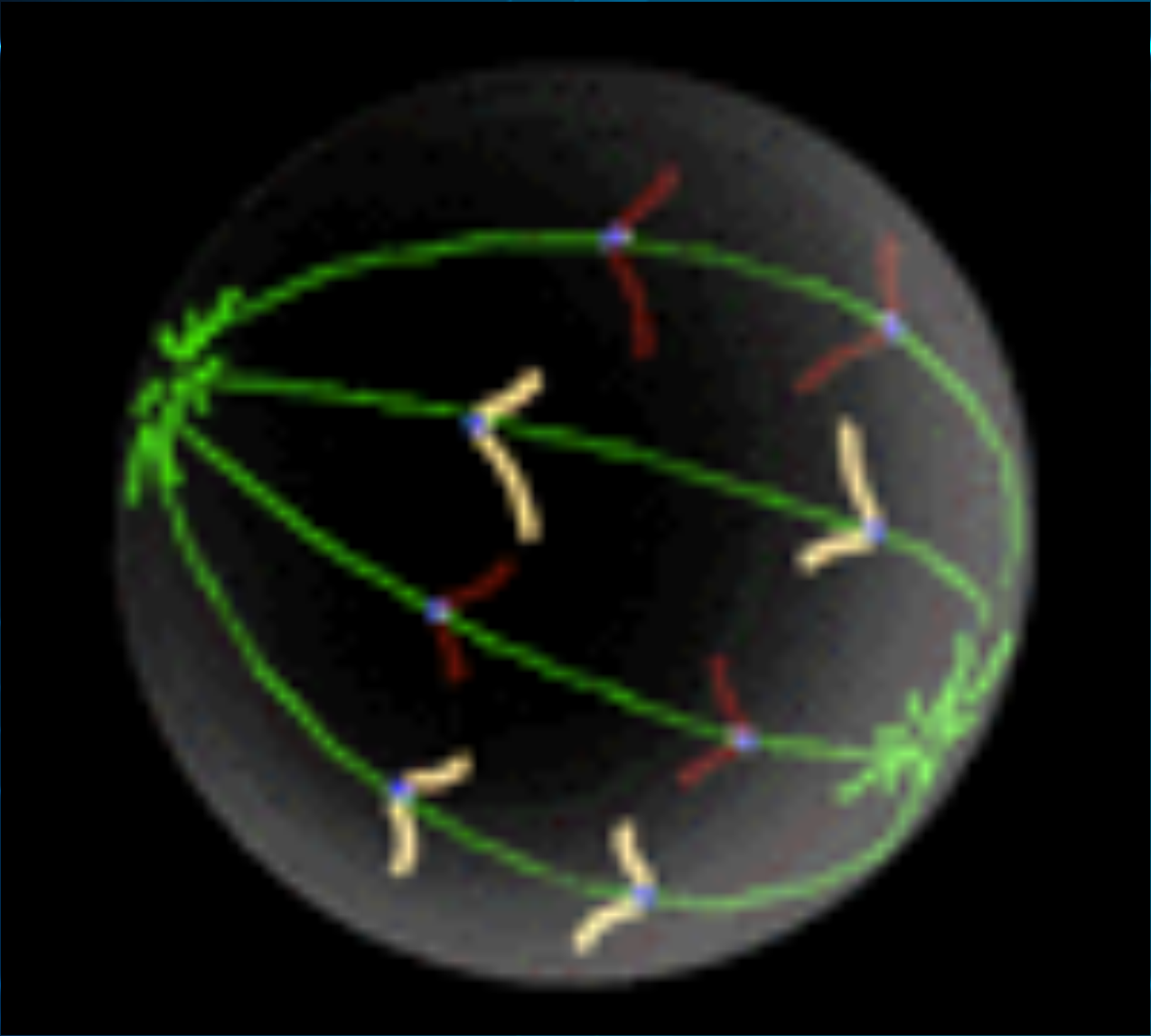
Metaphase

- **Chromosomes line up in the middle**
- **Spindle fibers grow from the centrioles to connect to the centromeres**



Anaphase:

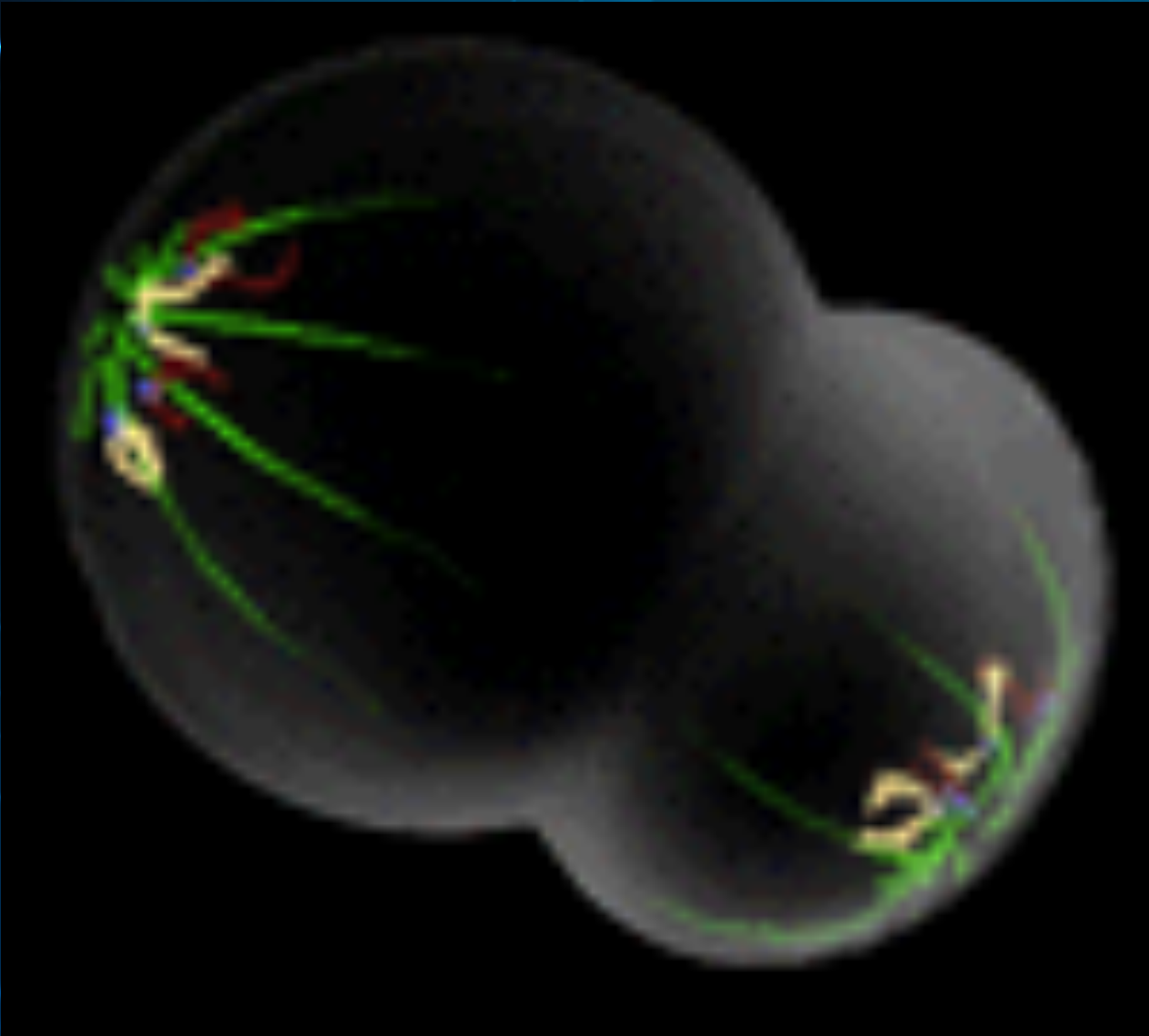
- Sister Chromatids separate from their copies (chromosomes split in half)**
- Pulled towards opposite poles**



Telophase:

-Each new cell has a complete set of chromosomes

-Nuclear envelope reforms



Shoulder buddy time...

- So at this point what has already divided?
What still needs to divide?



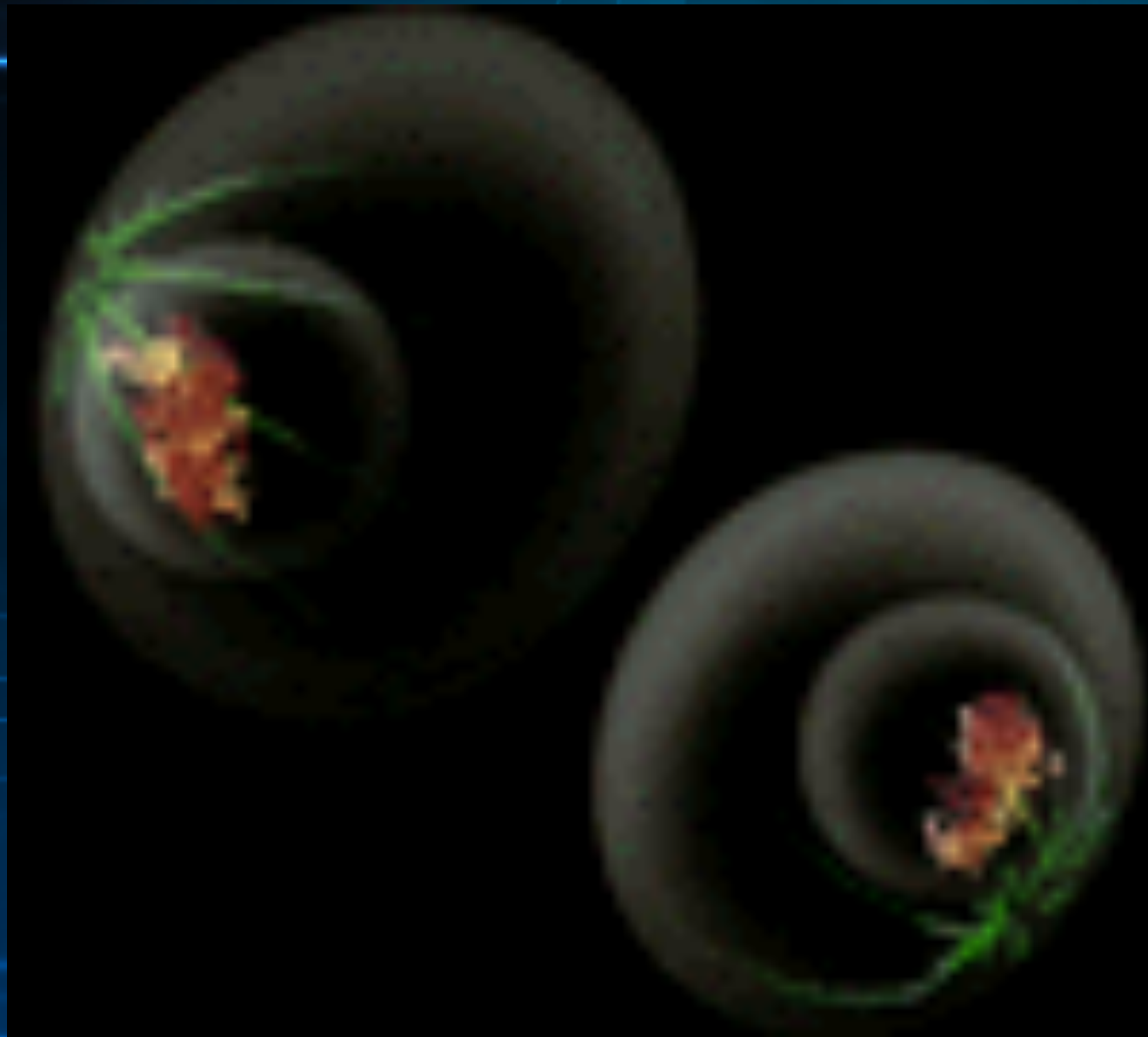
**Mitosis is over... now we need
to finish separating the two
cells**

Cytokinesis:

- Cytoplasm is separated in half to form two new cells**
- Two cells formed are identical**

Two types of cytokinesis...

- Cytokinesis
 - Animal cells – called cleavage furrowing as they pinch apart
 - Plant cells – cell plate formation, they build a “wall” in the middle in order to split apart



Shoulder buddy time...

- Where do you think on a plant you would see mitosis happen the most?? Why?

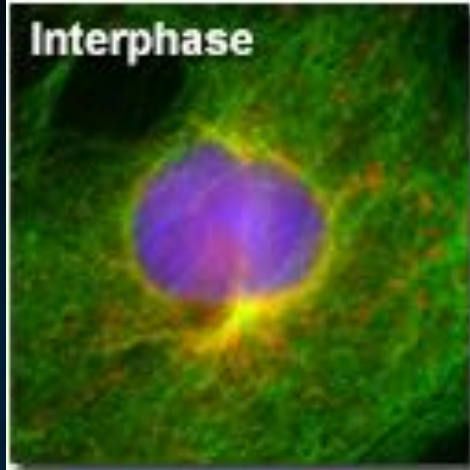
Another Top 5 Biology Video

- <http://youtu.be/VGV3fv-uZYI>

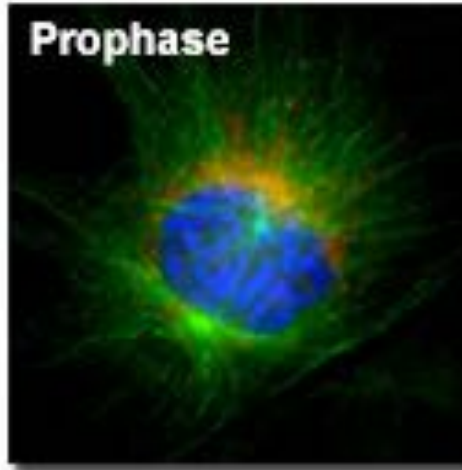
- **Interphase** – Close hands together – everything is condensed together to start
- **Prophase** – Fingers up and out – chromosomes are condensing, nuclear envelope disappearing
- **Metaphase** – Invert fingers together – chromosomes meet in the middle and line up on the metaphase plate
- **Anaphase** – Begin to pull apart – the chromatids move toward separate poles
- **Telophase** – Pull hands to two separate balls – chromosomes are at the poles and two separate cells are beginning to be formed

Real Cells!!

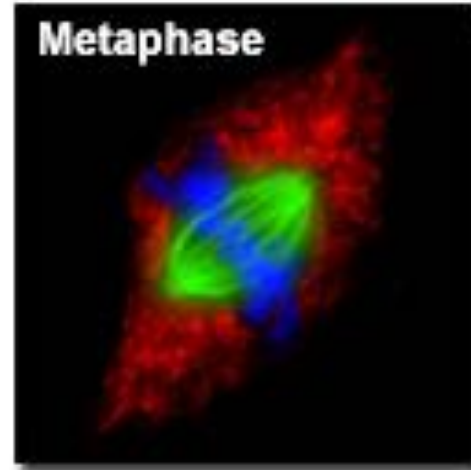
Mitosis in Rat Kangaroo Epithelial Kidney Cells



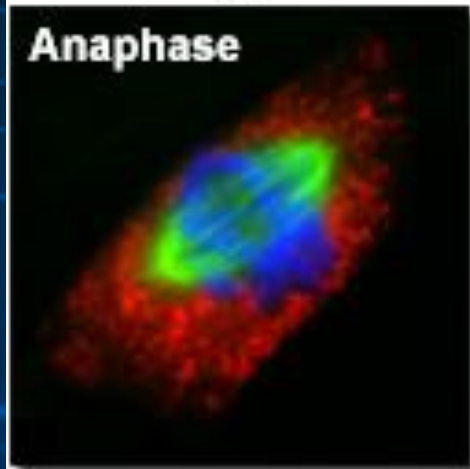
(a)



(b)



(c)



(d)



(e)



(f)

Figure 1













