- The interface is a very reactive period
  - Metabolic reactions, growth, DNA replication
  - Protein synthesis occurs at a rapid rate
- Exception Gap 0 (G0)
  - No growth takes place
    - Many cells spend more or less time in G0
      - For example, nerve cells spend a lot of time in G0
- The progression through the stages are controlled by a group of proteins called *cyclins*
  - Bind to *cyclin-dependent protein kinases* (CDKs) enabling them to act as enzymes
  - These activated enzymes cause the cell to move from G1 to S and from G2 to M
- The points where the cyclin-activated CDKs function are called *checkpoints* in the cell cycle

DNA condensation

- Starts in G2
- DNA is condensed by *supercoiling*
  - *Chromatin* (DNA + histones) begins to condense
  - DNA wraps around histones to produce *nucleosomes*
  - The nucleosomes are further wrapped into a *solenoid*
  - Solenoids group together in *looped domains*
  - Looped domains coil into *chromosomes*

Chromosomes

- After replication the chromosome includes 2 molecules of DNA
- Thes 2 identical molecules are held together by the *centromere* and each molecule is referred to as a *chromatid*
  - Together they are called *sister chromatids*
  - The centromere is a kind of protein
- The outer side of the centromere is called *kinetochore*

Mitosis

- Mitosis is divided in 4 phases
  - Prophase