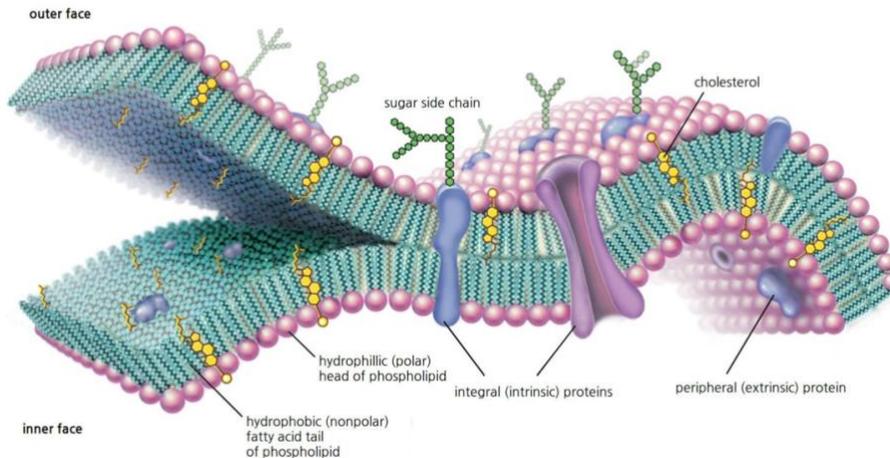


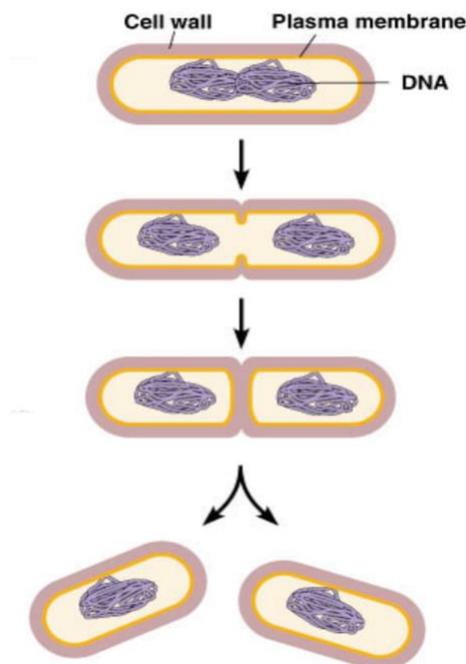
membrane

Omnis cellula e cellula. All cells come from cells. This biological dictum defines a dualistic reality: Every cell is a living system, separated from its non-living environment by a membrane. Life's primal event occurred long ago when a stable, self-replicating organism appeared for the first time on this planet. Since then, all life has come directly from a life before its own.

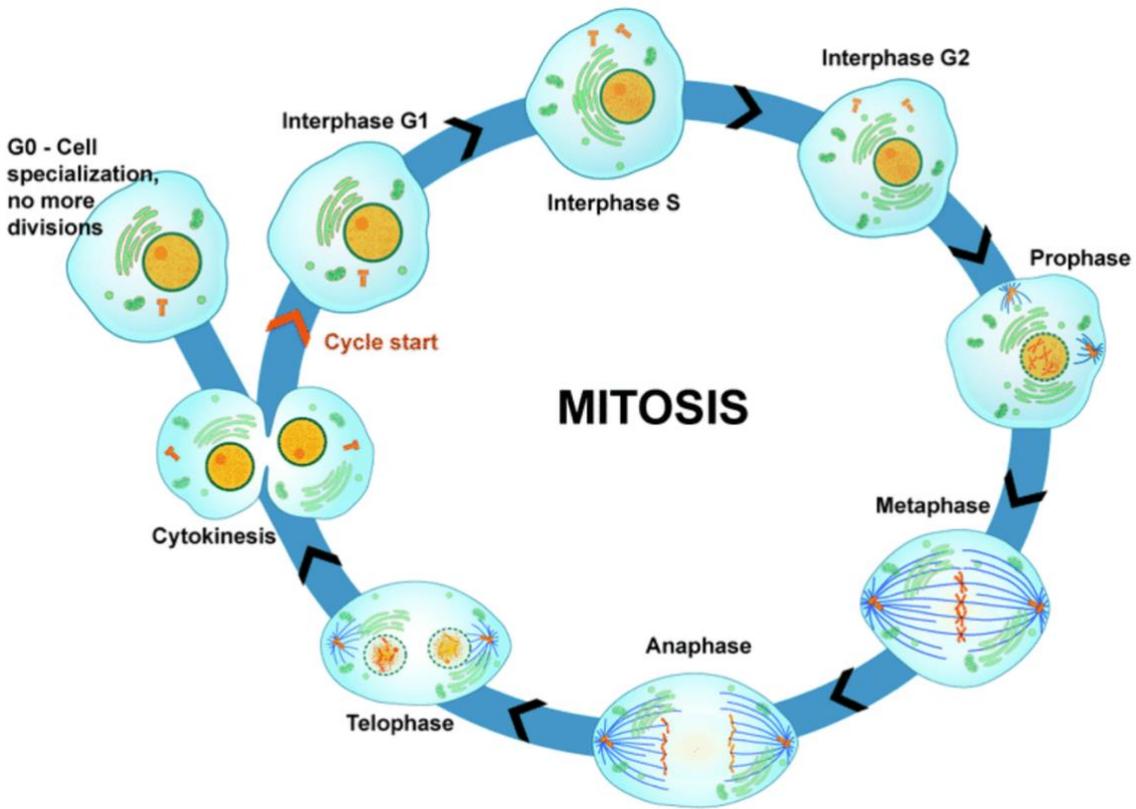


[image](#)

Each cell, whether of a unicellular organism or part of a much larger plant or animal, arises from fission of a parent cell. A portion of cell contents (electrolytes, proteins and other molecules, intracellular structures, and faithfully-replicated DNA), is carried along to the new cells. Sealing the boundaries of each new cell as it emerges is a bilayer lipid membrane, a portion of which is inherited from the parent cell. Thus, the primordial cell membrane that initially separated life from the outside world has formed an unbroken continuum - from the first living cell 3,800,000,000 years ago, extending throughout the entire biosphere.



Genetic understanding accelerated in the middle of the 20th century when DNA structure was first described. Since then, focus has been on the message of replication carried in the genetic code. Replication of *membrane*, from cell to cell, has also transmitted information from one generation to the next since the dawn of life. Later on, when eukaryotes arrived approximately 2,000,000,000 years ago, membranes of internal elements - mitochondria and chloroplasts and other organelles - also passed along structural information in an unbroken chain from one cell to the next, generation after generation.



[image](#)

Inheritance is a complex interplay which involves direct transmission of structural components as well as information encoded in DNA. Slight variations in genetic messaging, both directly by mutations and more dynamically by gene reassortment during sexual reproduction are the templates upon which selective pressures have acted to produce the huge diversity of organisms that have arisen over the vastness of time. The *membrane*, a stable and defining feature of the cell, has varied much less since life began.