Lysosome Encyclopedia Article

Lysosome

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Lysosomes are small membranous bags of digestive enzymes found in the cytoplasm of all eukaryotic cells (those with true nuclei). As the principle site of intracellular digestion, they contain a variety of enzymes capable of degrading proteins, nucleic acids, sugars, lipids, and most other ordinary cellular components. These enzymes hydrolyze (break down) their target compounds best under acidic conditions. Although lysosomes vary considerably in size even within a single cell, the normal range is usually 0.82-3.28 ft (0.25-1.0 m) or slightly smaller than the average mitochondrion.

The membrane enclosing lysosomes appears to be similar to that of other cellular organelles, but it has several unique properties. First of all, hydrogen pumps in the membrane acidify the lysosomal interior to a pH of five, an optimal level for the activity of its internal enzymes. The membrane has docking sites on its exterior that allow both materials to be digested and the enzymes to carry out the job to be transferred into the lysosome from transport vesicles derived from the Golgi apparatus, the endoplasmic reticulum, or from endocytosis by the plasma membrane. The lysosomal membrane also has transport complexes that allow the final products of digestion such as amino acids, simple sugars, salts, and nucleic acids to be exported back into the cytoplasm, where they can be either excreted or recycled by the cell into new cellular components. Finally, by mechanisms that are not yet fully understood, the lysosomal membrane is able to avoid digestion by the enzymes it contains even though it is composed of the same compounds that those enzymes routinely destroy.