**Cholesterol**

**Cholesterol** is an [organic](https://en.wikipedia.org/wiki/Organic_compound) [molecule](https://en.wikipedia.org/wiki/Molecule). It is a [sterol](https://en.wikipedia.org/wiki/Sterol) (or [modified](https://en.wikipedia.org/wiki/Chemical_modification) [steroid](https://en.wikipedia.org/wiki/Steroid)), a type of [lipid](https://en.wikipedia.org/wiki/Lipid). Cholesterol is [biosynthesized](https://en.wikipedia.org/wiki/Biosynthesis) by all animal [cells](https://en.wikipedia.org/wiki/Cell_%28biology%29#Eukaryotic_cells) and is an essential structural component of [animal](https://en.wikipedia.org/wiki/Animal) [cell membranes](https://en.wikipedia.org/wiki/Cell_membrane). It is also a precursor molecule for all [steroid hormones](https://en.wikipedia.org/wiki/Steroid_hormone) and [vitamin D](https://en.wikipedia.org/wiki/Vitamin_D).

Cholesterol also serves as a [precursor](https://en.wikipedia.org/wiki/Precursor_%28chemistry%29) for the [biosynthesis](https://en.wikipedia.org/wiki/Biosynthesis) of [steroid hormones](https://en.wikipedia.org/wiki/Steroid_hormone), [bile acid](https://en.wikipedia.org/wiki/Bile_acid) and [vitamin D](https://en.wikipedia.org/wiki/Vitamin_D). Cholesterol is the principal [sterol](https://en.wikipedia.org/wiki/Sterol) synthesized by all animals. In [vertebrates](https://en.wikipedia.org/wiki/Vertebrate), [hepatic](https://en.wikipedia.org/wiki/Liver) cells typically produce the greatest amounts. It is absent among [prokaryotes](https://en.wikipedia.org/wiki/Prokaryote) ([bacteria](https://en.wikipedia.org/wiki/Bacteria) and [archaea](https://en.wikipedia.org/wiki/Archaea%22%20%5Co%20%22Archaea)), although there are some exceptions, such as *[Mycoplasma](https://en.wikipedia.org/wiki/Mycoplasma%22%20%5Co%20%22Mycoplasma)*, which require cholesterol for growth.

Cholesterol is essential for all animal life, with each cell capable of synthesizing it by way of a complex 37-step process. This begins with the [mevalonate](https://en.wikipedia.org/wiki/Mevalonate%22%20%5Co%20%22Mevalonate) or [HMG-CoA reductase pathway](https://en.wikipedia.org/wiki/Mevalonate_pathway), which encompasses the first 18 steps. This is followed by 19 additional steps to convert the resulting [lanosterol](https://en.wikipedia.org/wiki/Lanosterol%22%20%5Co%20%22Lanosterol) into cholesterol.

A human male weighing 68 kg (150 lb) normally synthesizes about 1 gram (1,000 mg) of cholesterol per day, and his body contains about 35 g, mostly contained within the cell membranes. Typical daily cholesterol dietary intake for a man in the United States is 307 mg.

**Function in cells**

**Membranes**

Cholesterol, given that it composes about 30% of all animal [cell membranes](https://en.wikipedia.org/wiki/Cell_membrane), is required to build and maintain membranes and modulates [membrane fluidity](https://en.wikipedia.org/wiki/Membrane_fluidity) over the range of physiological temperatures. The [hydroxyl](https://en.wikipedia.org/wiki/Hydroxyl) group of each cholesterol molecule interacts with water molecules surrounding the membrane, as do the [polar](https://en.wikipedia.org/wiki/Polar_molecules) heads of the [membrane](https://en.wikipedia.org/wiki/Lipid_bilayer) [phospholipids](https://en.wikipedia.org/wiki/Phospholipid)

Through the interaction with the phospholipid fatty-acid chains, cholesterol increases membrane packing, which both alters membrane fluidity and maintains membrane integrity so that animal cells do not need to build cell walls (like plants and most bacteria). The membrane remains stable and durable without being rigid, allowing animal cells to change shape and animals to move.

**Gates**

Within the cell membrane, cholesterol also functions in intracellular transport, cell signaling and nerve conduction.

**Metabolism**

Cholesterol is [recycled](https://en.wikipedia.org/wiki/Enterohepatic_circulation) in the body. The liver excretes cholesterol into [biliary](https://en.wikipedia.org/wiki/Bile%22%20%5Co%20%22Bile) fluids, which is then stored in the [gallbladder](https://en.wikipedia.org/wiki/Gallbladder), which then excretes it in a non-[esterified](https://en.wikipedia.org/wiki/Ester%22%20%5Co%20%22Ester) form (via bile) into the digestive tract. Typically, about 50% of the excreted cholesterol is reabsorbed by the [small intestine](https://en.wikipedia.org/wiki/Small_intestine) back into the bloodstream.

