Autophagy is a cellular process used by cells for degradation and recycling. The word autophagy means ‘self-eating’, and refers to the digestion that occurs inside lysosomes. Once digestion has occurred, the degradation products are translocated to the cytoplasm and used to maintain cellular homeostasis. Autophagy is conserved from yeast to humans and is regulated by the Atg proteins. It is a cellular response to starvation and stress, and its dysregulation has been implicated in many pathological situations, from infection to cancer and neurodegeneration.

**Autophagy: Mechanisms and Function**

*Patricia Boya* and *Patrice Codogno*

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**Types of Autophagy**

Three main types of autophagy have been described in mammalian cells: macroautophagy, microautophagy and chaperone-mediated autophagy (CMA). All of these pathways converge in lysosomes to ensure intracellular degradation. Macroautophagy facilitates the recycling of cellular components, including organelles, through the formation of an autophagic vacuole, which fuses with a lysosome. The resulting autolysosome undergoes degradation by autophagy. 

**The Molecular Machinery Implicated in Macroautophagy**

During the first stages of autophagy in mammals, two macromolecular complexes are formed: the Class III PI 3-K complex and the Atg1/ULK1 complex. The Class III PI 3-K complex contains the catalytic subunit, PI 3-kinase, and the regulatory subunit, LC3. LC3 is a 20-kDa protein that is conjugated to phosphatidylinositol (PI) by hVps34, a Class III PI 3-kinase. The Atg1/ULK1 complex is a serine/threonine kinase that is activated by Beclin 1, a gene that is mutated in autophagy-deficient human cells. The Atg1/ULK1 complex is a serine/threonine kinase that is activated by Beclin 1, a gene that is mutated in autophagy-deficient human cells.

**Selective Autophagy**

Soluble organelles and proteins are specifically targeted for lysosomal degradation by autophagy. Depending on the cargo, the processes are named differently: microautophagy for the specific degradation of intracellular structures, macroautophagy for the specific degradation of intracellular organelles, and chaperone-mediated autophagy for the specific degradation of intracellular proteins. The specific degradation of intracellular structures, macroautophagy for the specific degradation of intracellular organelles, and chaperone-mediated autophagy for the specific degradation of intracellular proteins.