The first member of the mammalian mucolipin TRP channel subfamily (TRPML1) is a cation-permeable channel that is predominantly localized on the membranes of late endosomes and lysosomes (LELs) in all mammalian cell types. In response to the regulatory changes of LEL-specific phosphoinositides or other cellular cues, TRPML1 may mediate the release of Ca(2+) and heavy metal Fe(2+)/Zn(2+)ions into the cytosol from the LEL lumen, which in turn may regulate membrane trafficking events (fission and fusion), signal transduction, and ionic homeostasis in LELs. Human mutations in TRPML1 result in type IV mucolipidosis (ML-IV), a childhood neurodegenerative lysosome storage disease. At the cellular level, loss-of-function mutations of mammalian TRPML1 or its C. elegans or Drosophila homolog gene results in lysosomal trafficking defects and lysosome storage. In this chapter, we summarize recent advances in our understandings of the cell biological and channel functions of TRPML1. Studies on TRPML1's channel properties and its regulation by cellular activities may provide clues for developing new therapeutic strategies to delay neurodegeneration in ML-IV and other lysosome-related pediatric diseases [1)].

1)
Wang W, Zhang X, Gao Q, Xu H. TRPML1: an ion channel in the lysosome. Handb Exp Pharmacol. 2014;222:631-45. doi: 10.1007/978-3-642-54215-2_24. PMID: 24756723.