

## **Abstract**

The cell uses retrograde transport from endosomes to Golgi apparatus and further to the endoplasmic reticulum to recycle its receptors and other proteins. There are several pathways starting on different types of endosomes aimed to the *trans*-Golgi network and from it further to the endoplasmic reticulum. From the early and maturing endosomes the proteins are transported using the retromer complex. Rab9 GTPase is essential for transport from the late endosomes. Rab6 and Rab11 play major role in the transport from the recycling endosomes. There are two pathways going through the Golgi apparatus. The first one is mediated by COPI vesicles which are regulated by Arf1 GTPase and the pathway is sensitive to brefeldin A. The second pathway is regulated by Rab6 GTPase.

Except for endogenous proteins the retrograde transport is used by protein toxins and small unenveloped DNA viruses as well. Rab6 pathway from the recycling endosomes and through the Golgi apparatus is characteristic for Shiga toxin. The retrograde transport of ricin starts on the early endosomes and is less clear. Scientists only started uncovering the transport of small unenveloped DNA viruses.