Abstract

The anaerobic unicellular eukaryotic organism *Giardia intestinalis* is a worldwide parasite. Giardiasis, the intestinal disease caused by *Giardia*, is one of the most common parasitic disease in the developed part of the world, that causes health problems not only to humans but also to animals. This organism is also interesting for its many unique cellular features. One of them is the presence of mitosomes - the organelles derived from mitochondria. Analogously to mitochondria, mitosome is limited by two membranes and shares the mode of the protein transport. However, mitosome does not have its own genome and as far as we know, there is only one pathway of the iron-sulfur cluster biosynthesis in this organelle. Using the *in vivo* enzymatic tagging technique, several novel mitosomal proteins were identified, including GL50803_16424. The protein GL50803_16424 attracted our attention by interacting with components of all mitosomal subcompartments: the outer membrane, the membrane and the matrix. In addition, the expression of HA-tagged GL50803_16424 resulted in the formation of peculiar structures near the mitosomes never seen before in *G. intestinalis*. Bioinformatic approaches revealed that the GL50803_16424 has domain similar to the myelodysplasia-myeloid leukemia factor 1-interacting protein. Our data from mass spectrometry showed that the protein GL50803_16424 interacts with proteins of enodplasmic reticulum and mitosome. The tight connection between the protein GL50803_16424 and mitosomes was detected by super-resolution microscopy. In this work some characteristics of the protein GL50803_16424 were identified, but its function still remains unknown.