A Trk/HKT-type K+ transporter from Trypanosoma brucei

ID 524376
Author(s) Mäser, P.
Author(s) at UniBasel Mäser, Pascal ;
Year 2010
Title A Trk/HKT-type K+ transporter from Trypanosoma brucei
Journal Eukaryotic Cell
Volume 9
Number 4
Pages / **Article-Number** 539-46
The molecular mechanisms of K(+) homeostasis are only poorly understood for protozoan parasites. Trypanosoma brucei subsp. parasites, the causative agents of human sleeping sickness and nagana, are strictly extracellular and need to actively concentrate K(+) from their hosts' body fluids. The T. brucei genome contains two putative K(+) channel genes, yet the trypanosomes are insensitive to K(+) antagonists and K(+) channel-blocking agents, and they do not spontaneously depolarize in response to high extracellular K(+) concentrations. However, the trypanosomes are extremely sensitive to K(+) ionophores such as valinomycin. Surprisingly, T. brucei possesses a member of the Trk/HKT superfamily of monovalent cation permeases which so far had only been known from bacteria, archaea, fungi, and plants. The protein was named TbHKT1 and functions as a Na(+)-independent K(+) transporter when expressed in Escherichia coli, Saccharomyces cerevisiae, or Xenopus laevis oocytes. In trypanosomes, TbHKT1 is expressed in both the mammalian bloodstream stage and the Tsetse fly midgut stage; however, RNA interference (RNAi)-mediated silencing of TbHKT1 expression did not produce a growth phenotype in either stage. The presence of HKT genes in trypanosomatids adds a further piece to the enigmatic phylogeny of the Trk/HKT superfamily of K(+) transporters. Parsimonial analysis suggests that the transporters were present in the first eukaryotes but subsequently lost in several of the major eukaryotic lineages, in at least four independent events
Publisher American Society for Microbiology
ISSN/ISBN 1535-9778
edoc-URL http://edoc.unibas.ch/dok/A5842792
Full Text on edoc No;
Digital Object Identifier DOI 10.1128/EC.00314-09
PubMed ID http://www.ncbi.nlm.nih.gov/pubmed/20190075
ISI-Number WOS:000276369600006
Document type (ISI) Journal Article