# Functional characterization of iron transporter from *Dictyostelium discoideum* as a model of cellular iron homeostasis

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## Abstract

Iron plays a central role in a large number of essential cellular functions but it is also potentially toxic being able to generate reactive oxygen species.

The social amoeba *Dictyostelium discoideum* possesses several iron genes with the exception of transferrin, ferritin and TFR (Bozzaro *et al*., 2013; Peracino *et al.*, 2013) and represents a model for the study of cellular iron homeostasis showing subcellular localization of iron transporters resembling that of macrophages. In particular, *D. discoideum* expresses the ortholog of Nramp1 transporter in phago-lysosomes and that of Nramp2 in the contractile vacuole. To better understand the function of *dd* Nramp1, the protein was expressed in *Xenopus laevis* oocytes by cRNA injection and functionally tested by radiochemical and electrophysiological techniques. To increase the surface localization of *dd* Nramp1, its N and C termini were replaced with the corresponding regions of the murine DMT1, which shows a high level of expression in the membrane of *X. laevis* oocytes (Gunshin *et al*., 1997). *Dd* Nramp1 is an electrogenic proton-dependent divalent metal ion transporter with a cation selectivity comparable to that of the murine DMT1 (Illing *et al*., 2012). It transports ferrous but not ferric iron and it is partially inhibited by $Na^+$.