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Mechanisms of Cadmium Transport in Mammalian Cells

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Abstract:
According to early studies on the transport of cadmium (Cd), it was suggested that iron (Fe) or calcium (Ca) transport system is important in Cd incorporation into cells based on the evidence that dietary Fe or Ca deficiency enhanced intestinal Cd absorption. Transporter of Fe, divalent metal transporter, was shown to be capable of permeating other divalent metals including Cd. On the other hand, L-type Ca channel was also shown to be responsible at least in part, for cellular Cd uptake. In addition to Ca and Fe, it was suggested that the transporter for cellular incorporation of manganese (Mn) and zinc (Zn) may also be involved in Cd uptake by using Cd-resistant metallothionein null cells. Recently, two members of ZIP family, ZIP8 (Slc39a8) and ZIP14 (Slc39a14) have been suggested as the candidates for Cd transporter. ZIP8 was found to be the determinant for the sensitivity to Cd-induced testicular hemorrhage. ZIP14 was down-regulated in Cd-resistant metallothionein null cells. Further characterization of the roles of ZIP8 and ZIP14 in the transport of Cd, Mn and Zn is needed to clarify Cd transport system in mammals.

Key words: cadmium, DMT1, ZIP14, ZIP8, gene expression, transport

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