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Letter to the Editor

Reverse Transformation Agents and Their Ability to Complex Metal Ions

ZHONG-XIAN HUANG, PETER M. MAY and DAVID R. WILLIAMS
Department of Chemistry, University of Wales Institute of Science and Technology, Cardiff CF1 3NU, Wales, U.K.

GOSÁLVEZ *et al.* have shown that thiazolidine-4-carboxylic acid and 2-amino-2-thiazoline hydrochloride are capable of inducing reverse transformation in tumour cells [1–3] and they have suggested that metal ion binding is an essential feature of the mechanism. We have used our established bio-inorganic techniques to investigate the binding constants for these two agents with calcium, magnesium, manganese, nickel, copper and zinc metal ions, where solubility permitted [4–6]. The main stability constants which were determined potentiometrically are listed in Table 1.

Our results indicate that these two agents are not, in fact, very powerful complexing ligands. The primary amine nitrogen is the sole electron donor group involved in complexing for 2-amino-2-thiazoline complexes, whereas the carboxylate of thiazolidine-4-carboxylate takes up an additional coordination position in its complexes. In general, those complexes that are formed are favoured by organic solvents. If there is a disturbance to essential low-molecular-weight complexes, it would seem to be through manganese and zinc biochemistries.

Table 1. *Log formation constants at* 37°C

Species	Log β
(Ligand L = thiazolidine-4-carboxylate)	
LH	6.10
LH_2	7.83
LNi	4.00
L_2Ni	7.26
L_3Ni	9.24
LZn	3.19
L_2Zn	5.75
L_3Zn	7.88
LCu	6.02
L_2Cu	11.22
LCuH	7.85
LMg	1.68
LCa	1.66
LMn	1.90
(Ligand L = 2-amino-2-thiazoline)	
LH	8.48
LZn	3.15

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