

**Glutathione protects the Unicellular Marine Alga *Acetabularia*
against Cadmium Toxicity**

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The giant unicellular marine alga *Acetabularia acetabulum* is used in many laboratories as a model for experimental research in the field of fundamental and applied ecotoxicology (Arapis et al., 1988).

In recent studies we have found that cadmium, at concentrations $\geq 0.9 \mu\text{M}$, provoked a strong (> 50%) inhibition of cellular differentiation (cap formation) in both whole and enucleated cells (van der Ben et al., 1988a,b ; Bonotto et al., 1989 ; Qiu et al., 1989). This response of *Acetabularia* to cadmium intoxication prompted the search for protective substances against this toxic metal.

The tripeptide glutathione, which has a protective effect against ionizing radiations (Bonotto and Netrawali, 1969) and oxidation damages, was supplied to *Acetabularia*, alone (0.1 mM) or in combination with cadmium (0.9 and 1.8 μM). In addition, glutathione was added to the algae two days after cadmium, to reveal whether the effects of this metal could be reversed.

All together, the results showed a strong protective effect of glutathione against cadmium toxicity. Moreover, parallel experiments with the gamma emitting isotope ^{109}Cd , in combination with glutathione, suggested that the protective mechanism probably involved both extracellular and intracellular processes, leading respectively to a decrease of cadmium penetration into the cell and to a reduction of its availability for toxic interactions with cellular constituents.

References

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