

***RADICAL SCAVENGERS SUPPRESS LOW FREQUENCY EMF  
ENHANCED PROLIFERATION IN CULTURED CELLS AND  
STRESS EFFECTS IN HIGHER PLANTS INDUCED BY LOW  
ELECTROMAGNETIC FIELDS***

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**ABSTRACT**

In previous publications, we reported that sinusoidal varying magnetic fields (SVMF) modify the activity and dynamics of the malignancy marker adenosine deaminase, and enhance the proliferation of chick embryo fibroblasts (CEF). While the SVMF examined by us (50, 60 & 100 Hz / 0.06 - 0.7 mT) were all below kT, they may have the potential of altering chemical processes in which excited radicals are involved.

We tested this hypothesis in two experimental systems: CEF in culture and *Spirodela oligorrhiza* (Lemnaceae) (a small aquatic plant, commonly known as Duckweed). CEF were exposed to SVMF of 100 Hz / 0.7 mT for 24 h. The addition of the exogenous radical scavengers catalase, superoxide dismutase or vitamin E to the cells during exposure significantly suppressed enhancement of cell proliferation caused by the field (by 79%, 67% and 82%, respectively, as evaluated by the MTT colorimetric assay). <sup>15</sup>N NMR analysis of Duckweed plants fed by <sup>15</sup>N-labeled ammonium chloride and exposed to SVMF at 60 and 100 Hz / 0.7 mT for 24 h, revealed augmented alanine production.

Alanine did not accumulate in the absence of SVMF. The addition of vitamin C, a radical scavenger, reduced alanine production by 82%.

Exposure to SVMF resulted in specific metabolic stress effects in Duckweed plants and enhanced proliferation of CEF. In both cases, it is suggested that free radicals are involved.