Response to the letter to the editor

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The correspondence by Micke et al. points to the debated role of magnesium in tumor treatment. We addressed this issue in recent papers and in a lecture at the 12th International Magnesium Symposium held in Iasi, Romania, September 22-25, 2009 [1-3]. Moderate to severe hypomagnesemia induced by antitumor therapy with tubulotoxic chemotherapeutics or anti-EGF receptor antibody may contribute to the inhibition of tumor growth as well as neoangiogenesis. From this perspective, hypomagnesemia, in concert with cetuximab or anti-EGFR therapy, might conceivably act as a kind of chemosensitizer, as suggested by the results of Vincenzi et al. [4].

Micke and colleagues take a chance for discussing on an additional role for hypomagnesaemia as radiosensitizer. Indeed the role of magnesium as a stabilizer of DNA is well documented on both biochemical and biophysical grounds [5]. Even more importantly, it is also well known that magnesium is essential for the complex enzyme activities involved in the intricate processes of DNA repair [6]. In this context one may hypothesise that a drastic decrease of serum magnesium reflects in some imbalance in nuclear magnesium availability that, by affecting DNA stability and impairing DNA repair, eventually enhances the cytotoxic effects of chemo- and radio-therapy. A recent paper on the relationship between dietary magnesium intake, lymphocyte DNA repair capacity, and the risk of lung cancer fits nicely in this hypothesis [7].

Quite evidently, shaping the role of hypomagnesemia in tumor growth or tumor response to traditional chemotherapeutics or new generation targeted therapies calls for more direct evidence.

For basic scientists like us and the Journal’s readers it would be nice seeing these concepts move from hypothesis to real facts.

There is a growing but largely unmet need for studies that probe the role of hypomagnesemia in tumor treatment, whether in preclinical models or properly designed trials. Regrettably, however, funding agencies tend to decline grant applications aimed at exploring these issues. We hope that a better interaction of clinical oncologists with basic scientists will generate sufficient appeal and scientific soundness to attract funds in this arena.

References