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Preface

Vitamin D, Calcium, and Cancer

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The relevance of vitamin D and calcium for cancer prevention has been the focus of worldwide research activities since Garland *et al*. (1) in 1985 published the results of a 19-year prospective trial, showing that low dietary intakes of vitamin D and of calcium are associated with a significant risk of colorectal cancer. In the following years, many other types of cancer were identified as being sensitive to vitamin D and also to calcium. The role of these two factors in cancer development and progression has always been a topic of the meetings organized by the International Institute of Anticancer Research. In continuation of this tradition, a Special Symposium on "Vitamin D, Calcium, and Cancer" was organized at the 8th International Conference of Anticancer Research, which was held on the Island of Kos (Greece), October 17-23, 2008. This was a unique opportunity for a group of experts to present novel data and to intensively discuss the progress that has been made in our understanding of the relation between vitamin D status, calcium nutrition and cancer.

In their overview "Calcium, Vitamin D and Cancer", Peterlik *et al*. critically evaluate the evidence for a significant association of certain malignancies with vitamin D and calcium insufficiency. They also summarize findings from molecular and cellular pathophysiology that can explain how locally produced 1,25-dihydroxyvitamin D_3 (1,25-$(OH)_2D_3$) and extracellular Ca^{++} interact in a cell-specific manner to control cancer cell growth. In their article "Epidemiology of Vitamin D Insufficiency and Cancer Mortality" Pilz *et al*. show that careful adjustment of specific confounding factors is necessary to reveal a significant inverse relation between a low vitamin D status and total cancer mortality. The authors argue that improvement of the vitamin D status would reduce the high number of cancer deaths and also achieve better health outcomes in the general population (2). Along this line, Lagunova *et al*. studied "The Dependency of Vitamin D Status on Body Mass Index, Gender, Age and Season". Their findings of a high prevalence of vitamin D insufficiency in obese people explains at least in part why excess body weight can be linked to several types of cancer as well as to various non-malignant chronic diseases (cf. [2]). The analysis of the "Mutual Associations between Malignancy, Age, Gender, and Sub-site Incidence of Colorectal Cancer" by Brozek *et al*. indicates that women are protected from more aggressive cancers in the colon though not in the rectum until well after menopause. This likely reflects the differential sensitivity of the mucosa at these sub-sites against the anticancer effects of vitamin D mediated by activation of oestrogen receptor-β. Confirmation of this assumption can be found in the study by Nittke *et al*. on "Parallel Elevation of Colonic 1,25-$(OH)_2D_3$ Levels and Apoptosis in Female Mice on a Calcium-deficient Diet". Utilizing a newly developed method for the determination of 1,25-$(OH)_2D_3$ tissue concentrations, the authors show that female sex hormones may protect against growth-stimulating effects of low nutritional calcium by inducing the synthesis of 1,25-$(OH)_2D_3$ in the colon mucosa. A detailed summary of the role of vitamin D in colon cancer development and progression is given by Cross *et al*. in their article "Modulation of Vitamin D Synthesis and Catabolism in Colorectal Mucosa: a New Target for Cancer Prevention".

References

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2 Peterlik M and Cross HS: Vitamin D and calcium deficits predispose for multiple chronic diseases. Eur J Clin Invest 35: 290-304, 2005.

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