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EDITORIAL

First things first

Our knowledge of cancer biology has increased exponentially during recent years. We have learned a lot more about the essential processes necessary for a cell to acquire malignant potential and become more or less independent of the natural control mechanisms exerted by the host environment [1]. Great concerted international action has recently characterized the whole human genome [2,3]. When the task was completed, we did not reach the final answers on how tumour growth is controlled. However, new research has revealed that the transformation of the genetic code from DNA via RNA to proteins is far more complex than previously imagined. The expression of genes is controlled by several mechanisms. These include methylation of nucleotides in the promoter region of genes or histone acethylation, which control the folding of DNA and therefore have access to the encoded genes [4,5]. The RNA is also tightly controlled on its way from copying the DNA to coding for amino acids forming the peptides and proteins. Finally the peptide sequences are tightly controlled by chaperoning molecules that define the final 3D structure of the proteins. Also the functions of proteins are strictly regulated by specific hydroxylations, phosphorylations, acethylations, and methylations as is now well known from signal transduction pathways regulating cell growth and apoptosis.

The rapid growth of translational research with use of sophisticated technologies to measure mRNA expression by microarrays or analysing the proteins and peptides by 2D gel electrophoresis and microspectroscopy is currently providing a huge amount of data, further expanding our knowledge. Can we therefore think of skipping the traditional histopathological morphological analyses of tumour and normal tissues? The article in the current issue of Acta Oncologica by Professor Louis F Fajardo, senior pathologist at Stanford University [6], sums up a lifetime's experience of studies on the reaction in normal tissues exposed to radiation doses. He presented the material as an Acta Oncologica Lecture at the 5th Nordic Conference on Radiation Oncology, in Bergen, Norway, in June 2004. His main point is that there are characteristic tissue reactions depending on which tissues are exposed to radiation. This is very important knowledge that will form a platform to which we can relate our new findings from molecular biology related to the development of new techniques in radiation oncology [7,8].

It is a challenge for classical pathology to maintain the insights and skills to judge morphology and simultaneously add more specific tools such as immune histochemistry, in situ hybridizations, and mRNA expression, where more specific diagnoses may lead to information that can guide the selection of more specific therapy such as the thyrosine kinase signalling inhibitors currently being introduced into the clinic. Classical findings like the number of lymph nodes examined and number of involved lymph nodes are currently very important for assessment of the quality of surgery in colorectal cancer and to define who should have adjuvant chemotherapy [9]. Furthermore, invasion of vascular structures remains a significant prognostic factor in many cancer types, including bladder cancer [10]. As Acta Oncologica aims at being a central journal for clinical oncology, we therefore welcome more papers on histopathology alone or combined with new techniques. In particular we would like to see newer methods compared with classical pathology to demonstrate the real benefit of the more sophisticated tools. It is too easy to be fascinated by new methods. It should not be forgotten that the diagnosis of cancer is based on a firm diagnosis of the invasive nature of cancer cells assessed by an experienced pathologist! It is hoped that the current paper will stimulate more directed research into the tissue-specific mechanisms underlying the response of normal tissues to radiation in order to identify crucial targets for better tools to suppress or heal the unwanted effects of radiation. The interested reader can obtain further insight into this field by reading Fajardo's recent textbook on Radiation Pathology [11].

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