

**BuildMoNa Minisymposium 25/26 October 2010**

# *Physics of Cancer*

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The investigation of changes in physical, i.e. material, properties of cells during progression of cancer is an emerging field in physics redefining medical physics, which has been predominately a service to clinicians (imaging, radiation, etc) and now redefines itself based on material science. During malignant transformation of cells changes in their cytoskeleton, e.g. down regulation of actin and up regulation of intermediate filaments such as vimentin, occur. This leads to significant changes in tumor cells' viscoelastic properties, which are prerequisites for high cell proliferation and tumor invasion. Additionally, the expression of adhesion receptors such as E-cadherins decreases which changes cell motility due to less binding sites with adjacent cells and alters surface tensions that stabilize compartment boundaries between different cell types. The for tumor cells typical high proliferation, invasiveness, and metastasis are greatly hindered without these changes in a cell's material properties. Thus, the knowledge of these physical properties provides a powerful tool to determine the aggressiveness of a tumor and ultimately these findings may result in new therapies that stop the progression of cancer. These results illustrate that materials science can shed new light on tumor progression. The minisymposium will gather world-wide the pioneering groups that are concerned with the physics of cancer. These meeting will have a defining impact on a newly emerging scientific field.

The minisymposium "Physics of Cancer" aims towards bringing together the most important investigators in this field. Nature has expressed an interest to cover the meeting with a short report. Since the big "C"-word is always of public interest we have asked minister von Schorlemer (SMWK) to open the meeting.

The following speakers have accepted our invitation:

**Prof. Dr. Ramsey Foty**  
**Prof. Dr. Françoise Brochart-Wyart**  
**Prof. Dr. Jaques Prost**  
**Prof. Dr. Ben Fabry**  
**Prof. Dr. Robert Austin**  
**Prof. Dr. rer. nat. Dr. med. Michael Höckel**  
**Prof. Dr. Roland Eils**  
**Prof. Dr. Harald Herrmann-Lerdon**  
**Prof. Dr. med. Peter Friedl (invited)**