Stephanie Combs – excellent research on the treatment of brain tumours

Dr. Stephanie Combs, radiooncologist at the University of Heidelberg, was awarded the Hermann Holthusen Prize for her achievements in improving the treatment of malignant brain tumours. The prize, which comes with a purse of 5,000 euros, is the most prestigious prize in the field of radiooncology in Germany. Dr. Combs received the prize from the German Society of Radiooncology (DEGRO) at its annual meeting held in Magdeburg in June 2010. Dr. Combs’ most groundbreaking research deals with the efficacy of heavy ion radiation of malignant brain tumours. This research is the basis of a clinical trial that is currently being conducted at the Heidelberg Ion Beam Therapy Centre (HIT), which was officially opened in November 2009. The worldwide unique ion beam cancer therapy centre has since then treated more than 100 patients.

The prize is named after Professor Dr. Hermann Holthusen (1886-1971), a renowned radiologist from Hamburg whose research has made considerable contributions to reducing and preventing radiation damage caused by radiation therapy.

Malignant brain tumours hardly respond to standard therapies

Gliomas are the most common and malignant brain tumours in adults. Glioma patients have an average life expectancy of between one and two years. Common treatment is often a combined approach involving the complete as possible surgical removal of the tumour, followed by photon radiation therapy and chemotherapy. However, the treatment outcomes are unsatisfactory since the tumour is highly resistant to treatment and returns quickly. Therefore, new treatments are urgently needed.

In addition, this is on what Dr. Stephanie Combs’ scientific and clinical research focuses. Dr. Combs, senior physician in the Department of Radiooncology and Radiation Therapy at the University Hospital Heidelberg, and her team have developed therapeutic concepts that have already been successfully tested in clinical trials or are currently undergoing clinical testing. “The transfer of innovative concepts into clinical application has led to decisive improvements in treatment outcome, during the primary treatment subsequent to the diagnosis of a brain tumour as well as in the treatment of recurrent tumours,” said Dr. Combs whose team was able to establish the irradiation of recurrent previously irradiated primary brain tumours in clinical routine.

Heavy ion radiation in comparison with standard radiation therapy
Dr. Combs has established treatment concepts involving high-precision radiation therapy and the combination of radiation and chemotherapy for the treatment of malignant brain tumours. She has been able to show that heavy ion radiation was more effective against brain tumour cells than standard radiation therapy. Heavy ions have the advantage that they hit and destroy the tumour rather accurately and with high energy. The scientist and medical doctor is currently investigating whether the combination of chemotherapy and heavy ion radiation is superior to the treatment outcome of the individual therapies or of standard radiochemotherapy. Based on this preliminary work, the first randomised clinical trial was initiated at the Heidelberg Ion Beam Therapy Centre (HIT) for the treatment of malignant brain tumours (glioblastomas) using heavy ions (CLEOPARTRA trial).

Dr. Combs discovered a promising starting point for the targeted therapy of glioblastomas when she compared the proteins of glioblastoma cells with those of healthy brain cells. She found that the tumour cells produced higher amounts of EGFR growth factor, which promotes the division of cells. “Our experiments have shown that drugs that block this growth factor also slow down the rate of tumour cell division,” said Dr. Combs. A study led by Dr. Combs involving glioblastoma patients who were treated with EGFR inhibitors in combination with chemotherapy and radiation therapy provided excellent results. These results were presented at the world’s largest oncology congress organised by the American Society for Clinical Oncology (ASCO) in 2009.

Dr. Combs’ work was financially supported by a postdoctoral programme of the Heidelberg Medical Faculty and by the Heidelberg University Olympia Morata Programme. Her findings have been published in renowned journals such as the “Journal of Clinical Oncology”, “Cancer”, or the “International Journal of Radiation Oncology”. Besides focusing on brain tumour research, Dr. Stephanie Combs also coordinates studies dealing with the treatment of a number of other tumours (e.g. liver cancer) using heavy ion radiation.

Further information:
PD Dr. med. Stephanie E. Combs
Department of Radiooncology and Radiation Therapy
University Hospital Heidelberg
Im Neuenheimer Feld 400
69120 Heidelberg
Tel.: +49 (0)6221 / 56 82 01
E-mail: Stephanie.Combs(at)med.uni-heidelberg.de