Progression-related factors in Prostate Cancer

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Metastases are still the main cause of cancer-related deaths. Tumor progression depends on the complicated interplay of many elements i.e. specific subpopulations of tumor cells and different microenvironmental factors (e.g. cells, cytokines, etc.) modulating tumor outgrowth and/or dissemination. Prostate cancer (PCa) is one of the most commonly diagnosed cancer types among men in the industrialized countries. Although, standard serum prostate specific antigen (PSA) based screening is beneficial for reducing lethality of prostate cancer patients, it is still insufficient in determination of patients at high risk of progression.

This study aims to identify progression-related factors in PCa, particularly in d'Amico high risk patients. Different clinical material (primary tumors, blood samples) has been collected from patients undergoing radical prostatectomy at the University Clinic Münster, Germany and University Clinical Center in Gdansk, Poland. Tumor samples were prepared as tissue microarrays and examined for different proteins using immunohistochemistry. Outcomes were compared to clinico-pathological characteristics and patients' outcome. Among others, CD34 (vascular vessel marker), was used to assess the significance of low (VV^{low}) or high numbers of vessels (VV^{high}) in hormone-naïve PCa patients (Smentoch, et al., *Cancers*, 2019). VV^{low} were found in 32% of patients with informative PCa samples and correlated with a shorter time to biochemical recurrence 3, 5, and 10 years after prostatectomy in hormone-naïve patients ($p = 0.028$, $p = 0.027$ and $p = 0.056$, respectively). It was also shown to be an independent prognostic factor 5 years after surgery (multivariate analysis, $p = 0.046$). Tumors characterized by VV^{low} expressed less frequently the epithelial cell adhesion molecule, EpCAM ($p = 0.016$) and revealed a borderline correlation to increased levels of tumor cell invasion marker, Loxl-2 ($p = 0.059$). In summary, VV^{low} in hormone-naïve patients undergoing prostatectomy has prognostic potential and seems to be associated with an aggressive phenotype of tumor cells.

Peripheral blood from PCa patients has been processed using density gradient centrifugation and analyzed with the use of immunofluorescence to allow identification of different progression-relevant cells (CTCs and 'normal' blood cells) to find potential correlations to clinicopathological parameters and patients prognosis.