The Niche Architecture and Structure of Cancer Stem Cells

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Abstract #5145

Background: Cell nuclei with Feulgen-negative round areas of uniform diameters, originally described in the 1960s as reflections of a primary malignant tumor in a distant site, have been interpreted as a malignancy-associated change (MAC). The residing location of cancer stem cells is the stem cell microenvironment — the niche. In the niche the cancer stem cell is surrounded by a moderate to large halo formation with an inner membrane (N-cadherin). The supporting tumor or mesenchymal cells are molded tightly to the cancer stem cell border.

Methods: Past observations of cellular changes in cancer patients identified cells with numerous round, Feulgen-negative and uniform areas of diameter in the blood-smear of cancer patients.*** This coincidental finding led to the review of 76 histologic sections of adenomatous colonic polyps, 60 specimens of peripheral blood and 299 buccal mucosal spreads. Evaluation of the cell nuclear structure was made by high-power light microscopy using a 1000 x magnification lens for the specific structure in cells of the colon, peripheral blood and buccal mucosa distant from the primary tumor. The residing location of cancer stem cells is the stem cell microenvironment — the niche. In the niche the cancer stem cell is surrounded by a moderate to large halo formation with an inner membrane (N-cadherin). The supporting tumor or mesenchymal cells are molded tightly to the cancer stem cell border.

Results: The nuclear pattern originally identified as MAC denotes a cancer stem cell at a distance from the primary tumor. The nuclear pattern of spheres of diameter was found in cells of the colon, peripheral blood and buccal mucosa distant from the primary tumor were identified as cancer stem cells. Self-renewal and destination at distant sites. The nuclear-specific structure of these cells permits not only their identification but also their role as a reflection of a primary tumor at a different site.

Conclusion: The residing location of cancer stem cells is the stem cell microenvironment — the niche. In the niche the cancer stem cell is surrounded by a moderate to large halo formation with an inner membrane (N-cadherin). The supporting tumor or mesenchymal cells are molded tightly to the cancer stem cell border.

Acknowledgements

William Mager, PhD. for his generous assistance and advice in the preparation of the histology presentation.

References