

The cancer stem cells generate the components for the constitution of the supporting tissues in cancer

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The supporting tissues, including blood vessels, connection tissues and nerve tissues, are indispensable for all the steps, such as tumorigenesis, growth, progression and metastasis, of cancer development in human. The extracellular matrix applies essential roles in cancer progress and metastasis. The nervous system acts as a crucial part of cancer microenvironment. Infiltration of nerve fibers into cancer microenvironment plays an important active role in cancer progression. The stimulation of both cancer growth and metastasis by members of nervous system such as neurons and glial cells has been demonstrated. The growth of cancers depends on the formation of blood vessels that provide the supply of nutrients and oxygen. The angiogenesis and vasculogenesis are essential during cancer progression. Previous data show that the glioblastoma stem cells are able to give rise to vascular cells to constitute the functional vessels in tumor tissues. However, which kinds of vascular cells generated from glioblastoma stem cells are largely debated. In addition, there are few evidences to show that the stem cells from other kinds of tumors including carcinoma produce vascular cells to constitute the functional blood vessels in tumor tissues. Therefore, how the components of supporting tissues originate and how the supporting tissues constitute in cancer need to be addressed. Here, we found that a fraction of cancer stem cells (CSCs) derived from patients with gastric carcinoma and colorectal carcinoma are capable to give rise to neurons that are involved in tumor neurogenesis and tumor growth. A single cancer stem cell is able to generate neurons including sympathetic and parasympathetic cells to take part in the nervous system in cancer tissues. Knocking down the neural generating capabilities of the human CSCs inhibited the growth of tumors in the mouse models. We also identified that cancer stem cells of human colorectal carcinomas (CoCSCs) give rise to vascular endothelial cells and compose the vasculatures in cancer tissues. CoCSC derived endothelial cell incorporated blood vessels were functional. In addition, we identified that the extracellular matrix partially originated from cancer cells. Our data show that many components of supporting tissues originate from the cancer itself and provide an insight to understand how the cancer constitutes when the cancer occurs and progress.

Biography:

Xianming Mo, M.D. is the Professor, Director, Laboratory of Stem Cell Biology, State Key Laboratory of Biotherapy, West China Hospital, Sichuan University. He identified a mechanism how the virus protein v-Myb is involved in the development of leukemia and how Akt pathway is involved in lung carcinomas. He did pioneering work on the cancer stem cells in periphery blood of patients with gastric carcinoma and evaluated the features of the circulating gastric cancer stem cells from patients. He also developed the methods to enrich the cancer stem cells from tumor masses removed from patients with gastric, colon rectal and lung carcinomas for further analysis. Now one of his works focuses on the biology of the cancer stem cells in human patients. He serves as director of Laboratory of Stem Cell Biology, State Key Laboratory of Biotherapy, West China Hospital, Sichuan University in Chengdu, China.