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Opinion

Bone Marrow in Perspectives to Cure Breast Cancer

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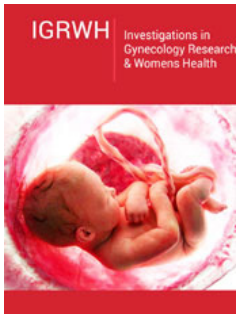

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Opinion

There are perspectives to cure breast cancer, and the main strategy in that way is the exact estimation of tumor dissemination at diagnosis. It is well proved that disseminated tumor cells in the bone marrow are the most important prognostic factor in operable breast cancer [1]. Its prognostic role become visible at late periods after surgery (sometimes, 25 years). Taking in mind that women with breast cancer are around 60-year-old, one may see that the relapses arises usually after 80. It appears in brain, lung and other distant organs as hematologic metastases, and unfortunately, nothing is possible to do in the most of those cases, so the main reasons of deaths in breast cancer are distant metastases.

Hematological dissemination of breast cancer takes place at very early stages of the diseases, sometimes even at carcinoma in situ [2]. The main reservoir of tumor cells in the organism is bone marrow [3,4]. Those cells survive for a long time and then wake up and come to some distant organs via blood stream. When the primary tumor was not completely resected or there is a tumor in lymph nodes these sites are preferential for re-seeding by tumor cells [5]. Not only primary tumor metastasizes but the metastases as well can metastasize into the primary tumor. It is their "home", and malignant cells should not adapt to breast tumor tissue and can survive there. Those cells not only survive but as well receive many new features, the most important of which is the possibility to multi-organ metastasizing. Kim et al. very carefully proved it in their fundamental article in Cell [5]. From clinical oncologist point of view, one of the main tasks is the complete elimination of primary tumor and regional metastases to prevent re-seeding.

There are not any treatment schedules for selective elimination of distant metastases from bone marrow, and immunological approaches seem to be the most perspective. There may be search for specific monoclonal antibodies to tumor-associated antigens, triggering of immune mechanisms of bone marrow cell subpopulations, and search for hematopoiesis peculiarities in cancer. Recently, serious attention in anticancer resistance is paid to inborn or native, natural B-cell immunity. That way of cancer cell elimination is the only one, which may be called the selective one. Binding to cancer-associated glycans natural pentameric IgM antibodies as well take some lipids, which in the cytoplasm of tumor cell dissociate from antibody complex, accumulates in tumor cell, and leads to malignant cell dying by the mechanism called lipoapoptosis. It is the only selective mechanism of cancer cell killing. German scientists achieved the main successes in that area [6,7]. As we have recently shown together with the team of Y. Kang (president of USA metastasis society) study of bone marrow opens some additional ways to improving treatment results in breast cancer [8].

Tumor-associated glycans are very good targets for selective tumor cell elimination. There are about 70 such glycans. Natural pentameric IgM antibodies to that glycans are making control of transformed cells. With ageing levels of such antibodies declines and are lower in cancer patients than in healthy persons. This may be a basis for selective immunodeficiencies [9]. Antibody immunodeficiency to tumor-associated glycan LeC in Lec-positive breast cancer patients proved to be in 35% of cases [10]. The message of this paper is to attract attention to one of the main strategies of oncology-careful estimation of tumor cell dissemination in breast cancer patients, control of those cells, and ideally-attempts to its eradication. The

anti-glycan approach is very useful in selective eradication of disseminated tumor cells from bone marrow [11]. Recent data proves the key role of bone marrow in tumor cell dissemination and cancer progression. Unfortunately, the study of bone marrow is not yet a standard in cancer patients.

References

1. Braun S, Vogl FD, Naume B, Janni W, Osborne MP, et al. (2005) A pooled analysis of bone marrow micrometastasis in breast cancer. N Engl J Med 353(8): 793-802.
2. Sai B, Juanjuan X (2018) Disseminated tumor cells in bone marrow are the source of cancer relapse after therapy. J Cell Mol Med 22(12): 5776-5786.
3. Pantel K (1993) Immunocytological detection of bone marrow micrometastasis in operable non-small cell lung cancer. Cancer Res 53(5): 1027-1031.
4. Chernysheva O, Markina I, Demidov L, Kupryshina N, Chulkova S, et al. (2019) Bone marrow involvement in melanoma. Potentials for detection of disseminated tumor cells and characterization of their subsets by flow cytometry. Cells 8(6): 627.
5. Kim MY, Oskarsson T, Acharyya S, Nguyen DX, Zhang HFX, et al. (2009) Tumor self-seeding by circulating cancer cells. Cell 139(7): 1315-1326.
6. Pohle T, Brandlein S, Ruoff N, Hermelink HKM, Vollmers HP (2004) Lipoptosis: tumor-specific cell death by antibody-induced intercellular lipid accumulation. Cancer Res 64(11): 3900-3906.
7. Brandlein S, Rauschert N, Rasche L, Dreykluft A, Hensel F, et al. (2007) The human IgM antibody SAM-6 induces tumor-specific apoptosis with oxidized low-density lipoprotein. Mol Cancer Ther 6(1): 326-333.
8. Zheng H, Bae Y, Bauer SK, Tang R, Chen J, et al. (2017) Therapeutic antibody targeting tumor and osteoblastic niche-derived jagged1 sensitizes bone metastasis to chemotherapy. Cancer Cell 32(6): 731-747.
9. Tupitsyn NN, Galanina OT, Bovin NV, Gadetskaya NA, Shelepova VM, et al. (2008) Level of specific antibodies to glycan LeC is diminished in breast cancer patients. Immunologia 2: 31-33.
10. Tupitsyn NN, Udalova YA, Galanina OE, Kadagidze ZG, Borovkova NB, et al. (2009) Tumor-associated glycan Lewis C in breast cancer. Haematopoiesis Immunology 6: 45-54.
11. Illert B, Otto C, Vollmers HP, Hensel F, Thiede A, et al. (2005) Human antibody SC-1 reduces disseminated tumor cells in nude mice with human gastric cancer. Oncol Rep 13(4): 765-770.