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Mast cell versus cancer cell: Who is in the trap?

Paul Ehrlich, in 1878, observed the "geographic" relationship between the mast cells (located in the connective tissue near blood vessels, glandular ducts and nerves), inflammation and neoplasia [1]. And today researchers are in the same trap: They recognize mast cells being in the crossroad of **I**nflammation-**A**llergy-**N**eoplasia (IAN) [2].

Which is the biological purpose of this relationship and which are the underlying mechanisms of possible inter-communication and inter-action? Set me a bridge to walk on by.

Are the three of them (IAN) edge-connected expressions of the same reaction? Is the last an "escape behavior" (suicidal though) from a sneaky or thunderous pressure which neither inflammation process nor allergic reaction managed to control or dissipate? And who has the power or the ability to shift the balance between physiology and pathology?

One may suggest inflammation a physiological reaction; allergy, a neurotic; and neoplasia, a psychotic reaction. In allergy, there is "recognition" of the enemy, his weapons, even his shadow, and an inability to get rid of him. In neoplasia, there is a deep disturbance of the "personality" of the cell, which does not recognize the limits of reality and turns out of control; it follows its own instructions. Autism? And among all those events (Inflammation-Allergy-Neoplasia) mast cell sends the message: IAN: **I A**m **N**ear. Why [3,4]?

There are two possibilities: a) Mast cells pre-existed; or b) They were attracted near. If the first is the correct answer, does that mean they represent "the first defense" of connective tissue? Is it possible that they keep the key-mechanism(s) to switch from inflammation to transformation? Did they really precede neoplasia [4-6]?

If the second is the correct answer, they were attracted from neoplastic cells, show me the "signal". Show me the purpose. Give me an answer: To feed or to fight? Who, indeed, is in the trap? And finally, why cancer cells almost always win?

A simplified approach to the previous questions is to continue the algorithm: Are "signals" from mast cells released to reach malignant cells? Do mast cells receive "messages" from transformed cells?

The answer of both questions is positive. Just bring up your familiar cytokines, growth factors and arachidonic pathway products. What a chatroom. But who started the network?

Finally, do you realize it? It is nothing new in wondering about the significance of the relationship between mast cells and carcinogenesis, since the concepts of "defense" and "growth promotion" for neoplasms of epithelial and mesenchymal origin were suggested. Only more confusion from too much information accumulating daily. More painters, more colors in the watercolor. What an artistic freedom for such scientific orientation.

But if, for a moment, you stop throwing data in and let the waters in the deep well of scientific research to calm, and after all these stones and dirt precipitate, then, I am sure that above the surface, somewhere in the wall of the well, you will be able to sight it: Waiting for your attention. No, it is not in your imagination. It comes from the mast cell. It is a butterfly. Let it fly [5-8].

Enjoy the view of its smoothness and gentleness. And give it the name of proteoglycan. Then, ignore the protein core. You concentrate in the glycosaminoglycans. The wings. The wings make the flight. Yes, between defense and defeat [7-9].

References

1. Androutsos G. Paul Ehrlich (1854-1915): founder of chemotherapy and pioneer of haematology, immunology and oncology. J BUON 2004; 9:485-491.
2. Henz BM, Maurer M, Lippert U, Worm M, Babina M. Mast cells as initiators of immunity and host defense. Exp Dermatol 2001; 10: 1-10.
3. Tainsh KR, Pearce FL. Mast cell heterogeneity: evidence that mast cells isolated from various connective tissue locations in the rat display markedly graded phenotypes. Int Arch Allergy Immunol 1992; 98: 26-34.
4. Krishnaswamy G, Kelley J, Johnson D et al. The human mast cell: functions in physiology and disease. Front Biosci 2001; 1: D1109-1127.

5. Theoharides TC, Conti P. Mast cells: The JEKYLL and HYDE of tumor growth. Trends Immunol 2004; 25: 235-241.
6. Conti P, Castellani ML, Kempuraj D et al. Role of mast cells in tumor growth. Ann Clin Lab Sci 2007; 37: 315-321.
7. Dimitriadou V, Koutsillieris M. Mast cell- tumour cell interactions: for or against tumour growth and metastasis? Anticancer Res 1997; 17: 1541-1550.
8. Nietfeld JJ. Cytokines and proteoglycans. Experientia 1993; 49: 456-469.
9. Theoharides TC, Patra P, Boucher W et al. Chondroitin sulphate inhibits connective tissue mast cells. Br J Pharmacol 2000; 131: 1039-1049.

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