Extracellular Galaxies

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The research story

Recent advances in immunotherapy for cancer have piqued our interest in the dynamic interplay between the immune system and the cancer microenvironment. In order for immunotherapy to be effective, the cat and mouse game between the immune cells and the cancer cells must be in the immune cell's favor. But the cancer cells are very good at hiding – in plain sight – from the immune cells. The research question is to understand how to eradicate the cancer cells by training the immune system to better seek and destroy the cancer cells by removing the cancer cell's camouflage.

The image

Here we see a pseudo-colored image of the extracellular, extravascular space within a small region of a theoretical brain tumor which produces a favorable environment for the immune system to operate. The center of the galaxy is full of dead cancer cells. This Extracellular Galaxy is full of potential for the immune system to effectively eradicate the cancer cells, as well as provide a window into the mysterious and dynamic space-time of the cancer microenvironment, in which the cancer cells invoke a Cloak of Invisibility to evade the immune system. We beg to ask the question: is the cancer warping its local biological space-time continuum? Is the Extracellular Galaxy expanding or contracting? One may never know.

F. Matthäus et al. (eds.), *The Art of Theoretical Biology*, https://doi.org/10.1007/978-3-030-33471-0_49