Preventing tumor cells from refueling: A new anti-cancer approach?

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New data, generated in mice, by Pierre Sonveaux and colleagues, at Université catholique de Louvain, Belgium, have identified a potential new target for anticancer therapeutics.

Not all cells in a tumor are equal, for example, some are in regions rich in oxygen, whereas others are in regions deprived of oxygen (hypoxic regions). It had been thought that the tumor cells in these two regions used the same type of fuel to generate energy, specifically glucose.

However, Sonveaux and colleagues have now shown that although hypoxic tumor cells use glucose to generate energy, well-oxygenated tumor cells use a different fuel, lactate. Further, the lactate used by the well-oxygenated tumor cells as a fuel was released from the hypoxic tumor cells as a waste product of the chemical reactions that burned glucose to generate energy, leading the authors to suggest that the different tumor cells exist in symbiosis.

More detailed analysis revealed that well-oxygenated cells took up lactate via the protein MCT1 and that inhibiting MCT1 made the well-oxygenated cells switch to using glucose as a fuel to generate energy. This disrupted the symbiotic relationship between the hypoxic and well-oxygenated tumor cells and in two mouse models of cancer led to decreased tumor growth, as the hypoxic tumor cells became deprived of glucose, and rendered the remaining cells sensitive to irradiation. As MCT1 expression was detected exclusively in nonhypoxic regions of human cancer biopsy samples, the authors suggest that MCT1 is a

potential new target for anticancer therapeutics. In an accompanying commentary, Greg Semenza, at Johns Hopkins University School of Medicine, Baltimore, discusses this concept further as well as other therapeutic implications.

Source: Journal of Clinical Investigation