Nature Communications: A type of immune cell strengthens immunotherapy and prevents tumor relapse in animal models

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A study led by the Centro Nacional de Investigaciones Cardiovasculares Carlos III (CNIC), in collaboration with the Instituto de Investigación Biomédica de Barcelona (IRB Barcelona), has identified the most effective subtype of dendritic cell for generating immune memory in response to cancer

Scientists at the Centro Nacional de Investigaciones Cardiovasculares Carlos III (CNIC), working in collaboration with the Instituto de Investigación Biomédica de Barcelona (IRB Barcelona), have discovered a new immunotherapy strategy that reduces cancer recurrence in mouse experimental models. The study, published in Nature Communications, shows that a specific subtype of immune cell—type I dendritic cells— is especially effective at activating a strong immune response and generating immune memory against cancer.

Dendritic cells act as sentinels of the immune system, presenting tumor antigens to T lymphocytes to initiate an immune response against malignant cells. However, there are multiple dendritic cell subtypes, and until now it was unclear which is the most efficient at generating a sustained, protective response to tumors.

First author Ignacio Heras-Murillo, of the CNIC, explains: “The finding is important because most current therapies focus on enhancing the immune response that is already in place. In contrast, this dendritic cell-based immunotherapy aims to induce a new, specific immune response against the tumor.”

Describing the strategy, study co-supervisor Stefanie Wculek—formerly at the CNIC and now at IRB Barcelona—explains that dendritic cells are extracted from the cancer-bearing mouse, loaded in the lab with tumor-derived antigens, and then reintroduced into the animal to activate specific T lymphocytes. The results show that type I dendritic cells not only trigger an immediate response against the primary tumor but also induce long-lasting immune memory capable of preventing tumor relapse.

CNIC scientist David Sancho, who led the study, adds that immunotherapy with type I dendritic cells presenting the tumor antigen triggers an immune memory response that prevents the growth of a second, similar tumor. In other words, the treatment helps prevent relapse in the mouse models. Further studies will be needed to assess the potential of this approach for preventing metastasis and its possible synergy with other antitumor therapies.

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- *Heras-Murillo I, Mañanes D, Munné P, Núñez V, Herrera J, Catalá-Montoro M, Alvarez M, Del Pozo MA, Melero I, Wculek SK, Sancho D. Immunotherapy with conventional type-1 dendritic cells induces immune memory and limits tumor relapse. Nat Commun. 2025 Apr 9;16(1):3369. doi: 10.1038/s41467-025-58289-1. PMID: 40204706.*

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