Transphagocytic T cells as anti cancer immunotherapy

CSIC´s research group, in collaboration with scientists from the Centre of Molecular Biology "Severo Ochoa" (CBMSO-CSIC), the Autónoma University of Madrid and the Health Research Institute of the "La Princesa" University Hospital, developed a new method for anti-cancer immunotherapy based on transphagocytic lymphocytes (tiCD4+ T cells)

Companies interested in a patent license or investors for creation of a start-up are being sought.

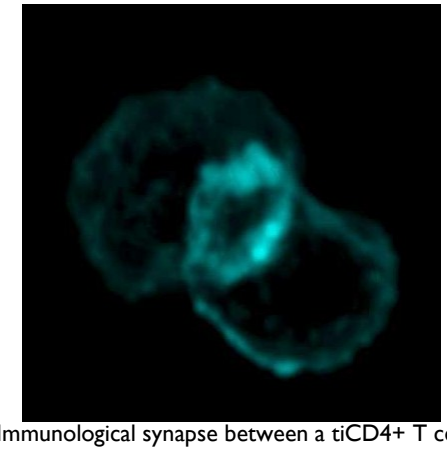
An offer for Patent Licensing

CD4+ T cells are novel and potent tools in cancer immunotherapy

The results shows, for the first time, that CD4+ T cells, the paradigm of adaptive immune cells, and contrary to the current view, are bona fide antigen presenting cells.

It has recently shown that CD4+ T cells capture (and kill) bacteria from infected dendritic cells (DCs) in a process termed transinfection. Now, they have shown that CD4+ T cells process and cross-present bacterial antigens to naïve CD8+ T cells, which massively proliferate and become cytotoxic, triggering an immune response to cancer and infectious diseases.

The therapeutic potential of this potent activation of CD8+ T cells was tested using an aggressive melanoma tumor model (B-16OVA). They have showed that mice vaccinated with tiCD4+ T cells capturing bacteria (Listeria monocytogenes) expressing tumor antigens (OVA) are protected against tumor formation, which highlights the potential of tiCD4+ T cells as a potential tool for cancer immunotherapy.



Immunological synapse between a tiCD4+ T cell as antigen presenting cell and a CD8+ T cell, that is being activated. It is shown the actin ring typical of productive immunological synapses

Main innovations and advantages

- The invention can be used to prevent/treat tumours and/ or stimulation of an immune response against tumour antigens.
- tiCD4+ T cells (trained by bacteria) are newly defined antigen-presenting cells that can be useful as a cancer immunotherapy tool.
- tiCD4+ T cells mediated antigen presentation potently cross-prime naïve CD8+ T cells.
- tiCD4+ T cells mediated antigen presentation generates central memory C8+ T cells with very low levels of PD-1.
- The anti-tumour activity of tiCD4+ T cells has been tested in mouse melanoma models. The invention can be applied for melanoma and other highly immunogenic tumours.

Patent Status

Patent filed in USA, Canada, Australia and EU

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