Journal for ImmunoTherapy of Cancer

POSTER PRESENTATION Open Access

Enrichment and expansion with nanoscale artificial antigen presenting cells for T cell adoptive immunotherapy

Karlo Perica[1*], Joan Bieler[1], Christian Schuetz[1], Juan Varela[1], Mathias Oelke[1], Jonathan Schneck[2]

From Society for Immunotherapy of Cancer 29th Annual Meeting
National Harbor, MD, USA. 6-9 November 2014

Adoptive T cell therapy can mediate durable regression of cancer [1]. While pre-existing anti-tumor responses can only be cultured from a minority of cancer patients [2], T cells specific for a wide variety of tumor antigens can be generated by stimulation of naive precursor cells with tumor antigen [3]. This culture process relies on autologous antigen presenting cells and feeder cells, which are complex biologics that must be generated for each individual patient [4], significantly increasing the cost and complexity of adoptive immunotherapy.

To quickly generate large numbers of functional tumor-specific T cells from naïve T cell precursors, we developed a T cell Enrichment+Expansion strategy using paramagnetic, nanoscale artificial Antigen Presenting Cells (nano-aAPC), which are capable of enriching rare tumor-specific T cells in a magnetic column and activating them. We generated up to 150,000 total Trp2-specific cells in only one week from 10 million polyclonal CD8 lymphocytes containing approximately 10 precursor cells [5]. Similar results were obtained for other tumor and model antigens, including the human tumor antigens A2-NY-ESO1 and A2-MART1. We further demonstrate that removing irrelevant bystander cells by enrichment confers a significant survival and proliferation advantage to tumor-specific T cells both during *in vitro* culture and after adoptive transfer *in vivo*. Streamlining the generation of large numbers of high-frequency tumor-specific T cells in a cost effective, reproducible fashion through Enrichment +Expansion could be a powerful addition to autologous tumor immunotherapy protocols.

[1]Johns Hopkins School of Medicine, Baltimore, Maryland, United States
Full list of author information is available at the end of the article

Authors' details
[1]Johns Hopkins School of Medicine, Baltimore, Maryland, United States. [2]Johns Hopkins School of Medicine, Department of Pathology, Institute for Cell Engineering, Baltimore, Maryland, United States.

Published: 6 November 2014

References

1. Restifo NP, Dudley ME, Rosenberg Sa: **Adoptive immunotherapy for cancer: harnessing the T cell response.** *Nat Rev Immunol* 2012, **12**:269-81.
2. Dudley ME, Rosenberg Sa: **Adoptive-cell-transfer therapy for the treatment of patients with cancer.** *Nat Rev Cancer* 2003, **3**:666-75.
3. Yee C: **The use of endogenous T cells for adoptive transfer.** *Immunol. Rev* 2014, **257**:250-63.
4. Itzhaki O, Hovav E, Ziporen Y, Levy D, Kubi A, Zikich D, Hershkovitz L, Trevess AJ, Shalmon B, Zippel D, Markel G, Shapira-frommer R, Schachter J, MJBJ : **Establishment and Large-scale Expansion of Minimally Adoptive Transfer Therapy.** *J Immunother* 2011, **34**:212-220.
5. Jenkins MK, Chu HH, McLachlan JB, JL : **Moon, On the composition of the preimmune repertoire of T cells specific for Peptide-major histocompatibility complex ligands.** *Annu Rev Immunol* 2010, **28**:275-94.

doi:10.1186/2051-1426-2-S3-P34
Cite this article as: Perica *et al.*: Enrichment and expansion with nanoscale artificial antigen presenting cells for T cell adoptive immunotherapy. *Journal for ImmunoTherapy of Cancer* 2014 **2**(Suppl 3):P34.