Preclinical studies support therapeutic application of the leukemic cell-based cancer relapse vaccine DCP-001 in ovarian cancer

Maho Nagasawa1, Remco Bos1, Haoxia Zuo1, Klave Yune Ho Wang Yin2, Marie-José van Lierop1, Sebastien Tabruyn1, Erik Manting1, Marco de Bruyn3, Hans Nijman3 and Satwinder Kaur Singh2

1DCPrime, Leiden, The Netherlands; 2TransCure bioServices, Archamps, France; 3University Medical Center Groningen, Groningen, The Netherlands

Introduction

Ovarian cancer (OC) is the gynecological malignancy with the highest mortality due to the late diagnosis of disease and a high rate of relapse following initial therapy. Immunotherapy in combination with standard treatment modalities has emerged as an encouraging treatment approach to surmount this unmet medical need.

DCP-001 is a cancer relapse vaccine derived from the DCOne human leukemic cell line and is currently progressing through clinical trials in hematological malignancies. During manufacturing, DCOne cells are shifted towards a mature dendritic cell phenotype, rendering the cells highly immunogenic and providing the basis for DCP-001, which is administered as an intradermal vaccine. DCOne cells express multiple common tumor-associated antigens (TAA) such as WT-1, RHAMM, PRAME and MUC1, which have been documented as potential target antigens in ovarian cancer. This observation suggests that DCP-001 vaccination may also have an anti-tumor effect in OC. To support this hypothesis, the capacity of DCP-001 to induce immune responses against OC was studied in human peripheral blood mononuclear cells (PBMC) and a humanized mouse model for OC.

Methods

The effect of DCP-001 on T cells from OC patients or healthy controls was evaluated after a 3 week culture of peripheral blood mononuclear cells (PBMC) with or without DCP-001. Cytotoxic activity was analyzed by specific IFNγ production and CD107a expression when these cells were subsequently cultured with OC cell lines SKOV3 or OV90. The effect of DCP-001 vaccination in vivo was evaluated in humanized NOD mouse subcutaneously engrafted with SKOV3 OC cells. Mice received intra-peritoneal (i.p.) vaccination with DCP-001 prior to SKOV3 engraftment and tumor size was measured to evaluate the efficacy of DCP-001.

Conclusion

In vitro studies show that DCP-001 is able to induce a T-cell response in ovarian cancer PBMC, including a response directed against ovarian cancer cell lines. In vivo studies performed show that DCP-001 vaccination leads to tumor growth control. These results support the potential use of DCP-001 as a cancer relapse vaccine in ovarian cancer, with the aim to reduce disease recurrence following initial standard of care therapy.