

Phenotypic and functional characterization of endothelial progenitor cells isolated from peripheral blood of renal cell carcinoma patients

Valentina Poletto¹, Dmitry Lim², Silvia Dragoni³, Adele Aronica¹, Carlo Ganini⁴, Elisa Bonetti¹, Domenico Tafuri⁵, Marianna Paccone⁶, Mariapia Cinelli⁶, Stefania Montagnani⁶, Franco Tanzi³, Camillo Porta⁴, Francesco Moccia³, Vittorio Rosti¹ and Germano Guerra⁷

¹Laboratory of Biotechnology, Fondazione IRCCS Policlinico San Matteo, 27100 Pavia, Italy

²Department of Pharmaceutical Sciences, University of Eastern Piedmont "Amedeo Avogadro", 28100 Novara, Italy

³Department of Biology and Biotechnology "L. Spallanzani", University of Pavia, 27100 Pavia, Italy

⁴Medical Oncology, Fondazione IRCCS Policlinico San Matteo, 27100 Pavia, Italy

⁵Department of Sport and Health Sciences, University of Naples "Parthenope", Napoli, Italy

⁶Department of Public Health, University of Naples Federico II, 80131 Napoli, Italy

⁷Department of Medicine and Health Sciences, University of Molise, 86100 Campobasso, Italy

Endothelial progenitor cells (EPCs) are mobilized from either bone marrow or arterial walls to restore blood perfusion to ischemic organs and establish the vascular network within growing tumors [1]. The Ca²⁺ machinery plays a key role in EPC activation and might serve a molecular target for novel therapies of highly angiogenic tumors, such as renal cell carcinoma (RCC) [1]. The Ca²⁺ toolkit is remodelled in EPCs isolated from RCC patients (RCC-EPCs) as respect to healthy donors [2]. The present study was undertaken to evaluate for the first time the functional properties of EPCs isolated from tumor patients by focusing on RCC-EPCs. We extended our analysis at microscopic level by monitoring the sub-cellular structure of RCC-EPCs relative to their Ca²⁺ signalling fingerprint. Our results showed a striking functional and ultrastructural difference between RCC-EPCs and their normal counterparts, which might be the basis for designing novel, more specific anti-angiogenic treatments.

References

- [1] Moccia et al. (2012) Store-dependent Ca²⁺ entry in endothelial progenitor cells as a perspective tool to enhance cell-based therapy and adverse tumour vascularization. *Curr Med Chem* 19: 5802-5818.
- [2] Lodola et al. (2012) Store-operated Ca²⁺ entry is remodelled and controls in vitro angiogenesis in endothelial progenitor cells isolated from tumoral patients. *PLoS One* 7: e42541.