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MAIN FIELDS OF RESEARCH; ABSTRACT

Ionizing radiation (IR) leads to DNA damage and genome instability. In addition, IR also leads to stress responses in tumor cells by activating signal transduction pathways and inducing secretion of numerous factors. As part of an exhaustive IR-dependent secretome analysis, which was previously performed in our laboratory, placental growth factor (PlGF) was identified to be secreted in response to IR.

PlGF is a homodimeric protein and belongs to vascular endothelial growth factor (VEGF) family. It phosphorylates VEGFR1 and leads to activation of downstream targets. PlGF levels is low to undetectable in most tissues in healthy subjects, but becomes significantly increased in disease. However, compared to VEGF, PlGF is not as extensively studied and the mechanism behind its IR-induced role remains unclear.

In this project, we have shown upregulation of PlGF expression and secretion in a time- and dose-dependent manner across multiple cancer cell lines in response to increasing doses of IR. Interestingly, some of the cell lines show minimal or delayed response to IR. Therefore, we hypothesize that the differential regulation of PlGF might depend on the genetic background and/or different signal transduction pathways. We aim to investigate these signaling pathways and resulting cellular responses more in detail in order to understand the role of PlGF as a rescue mechanism to irradiation.