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Effects of metformin in cell growth and proliferation of pheochromocytoma cell lines

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Pheochromocytomas are rare neuroendocrine tumors localized in the adrenal medulla and derived from chromaffin cells. That malignant still demands effective pharmacological treatment. In some cases, the multi-targeted tyrosine kinase inhibitors are indicated (TKi), specifically sunitinib, but it has shown conflicting results. On the other hand, metformin anti-tumoral effects have been demonstrated in various cancer cells lines and have been associated with AMPK activation and mTORC1 inhibition resulting in growth and proliferation decrease. The anti-tumoral effect of metformin on pheochromocytoma has not been explored. Accordingly, we aimed to evaluate the effects of metformin and sunitinib (assay pattern) in pheochromocytoma cells. Firstly, we treated PC12-Adh pheochromocytoma cells with a metformin solution 30 mM to evaluate the O₂ consumption by respirometer and this showed a decrease of O₂ consumption by cells. We investigated the cell viability by the trypan assay after 24 and 48 h treatment with metformin solution in concentrations of 0 to 30 mM as compared to untreated cells (control). We showed that metformin induced a maximum inhibition of 60% of cell viability after 48 h of treatment. Moreover, the Western Blot assay indicated that metformin decreased mTOR signaling, which was suggestive of growth and cell proliferation impairment. Our results suggest that metformin has a moderate inhibitory effect on the O₂ consumption of pheochromocytoma cells, this could induce the decrease of the viability of cells, and this effect can be seen by decreased of mTOR signaling. The hypothesis of a possible inhibitory modulation of metformin on antiproliferative effect and the molecular mechanisms deserve additional studies.

Biography

Cinthia Gabriel Meireles has graduate degree in Pharmaceutical Sciences from Pitagoras University and has completed her Post-graduation in Clinical Pharmacology from University of Brasilia (2013). She has completed her Master's degree in Health Sciences from University of Brasilia in the year 2015. Currently, she is pursuing PhD in Pharmaceutical Sciences from University of Brasilia, Brazil.

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