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Anti-cancer drug discovery: Rational strategy to acquire anti-cancer candidate compounds

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Statement of the Problem: Cancer is a set of malignancies that has in common the exacerbated and uncontrolled cellular growth, as well as the capacity of cellular invasion to different organs of the primary site. Neoplastic transformation occurs through the acquisition of characteristics related to proliferation, invasion, metastasis, resistance to death, genomic instability, among others. Our research group has as main objective the search of new molecules that act inhibiting these pathways.

Methodology: Cell viability assay, combination assay, morphological analysis, proliferation assay, wound healing assay, cell cycle analysis, gelatin zymography, matrigel invasion assay, soft agar colony assay, acridine orange staining, detection of mitochondrial membrane potential, comet assay, western blot, *in vitro* retina model, *in vivo* chick chorioallantoic membrane (cam) assay and in vivo models for studying breast cancer development, and thin layer chromatography and spectrometry of masses.

Findings: We have been able to screen samples from the production of crude to fractionated extracts that are selectively cytotoxic to tumor cells. In addition, we determine the major pathways by which these cells die. We determined whether these treatments cause a change in the pattern of migration and cellular invasion and the involvement of the matrix metalloproteinases 2 and 9 in these processes. We selected several samples that will be submitted to *in vitro* cytotoxicity tests. Finally, with human cell lines, we determine the angiogenic capacity and tumor growth by CAM. If the cell line is murine, we carry out *in vivo* tests in mice. The better samples are directed to bioassay-guided purification that involves diverse chromatography methods. In addition, if the active substance is unpublished, it is directed to identification by appropriate chemical techniques.

Conclusion & Significance: By combining such approaches, we maximized the selection of molecules potentially relevant for the discovery of anticancer molecules.

Biography

Rosy I M A Ribeiro has obtained her postgraduate degree from the University of Minas Gerais (UFMG) in Pathology. She is an Associated Professor of Cell Biology at Medicine Department of Federal University of São João del Rei (UFSJ), Brazil. Currently, she is the Coordinator of the Biotechnology Graduate Program of UFSJ. Her research and publications are about the action of both synthetic and natural products on pathological processes such as wound healing and cancer.

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