Cellular and molecular targets in the evaluation of the antitumor potential of biocompounds

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Despite significant improvements and innovations in therapy for specific tumors, cancer continues to represent a major medical concern, curtailing longevity and quality of human life. Although the precise reason for the lack of greater efficacy of current therapies is not known, it may be related to the fact that cancer represents the culmination of alterations in the expression of several genes and proteins affecting the proliferative control in tumor cells and the response to chemotherapy. Therefore, the understanding of the mechanisms of action of new agents provides tools for the development of alternative approaches in cancer treatment, including new therapeutic modalities and targeted therapeutics. This review will focus on the cellular and molecular basis of the immunomodulatory and antitumor actions of two natural compounds, the proteic aggregated polymer P-MAPA, isolated from Aspergillus oryzae and the cytotoxic pigment violacein, isolated from Chromobacterium violaceum. The investigation of several in vivo and/or in vitro parameters such as cell differentiation and apoptosis induction pathways, natural killer activity and cytokine production have provided insights into their potential application for cancer therapeutics. In addition, future studies of combined therapy and new approaches to improve their efficacy have been suggested.

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