Bauhinia stem extracts as a possible new treatment for breast cancer and metastasis: inhibition of migration, invasion and of the activity of matrix metalloproteinases.

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Abstract

Metastasis is the main cause of cancer-related death and requires the development of effective treatments with reduced toxicity and effective activity. The breast cancer is the most common among women and the second most prevalent type in the entire population. Thus, the search for new sources of antitumor and anti-metastatic therapies, such as for example in plants, is very important. In this work, we showed the antitumor and antimetastatic activities of four fractions (ID7, IID10, IA19 e IIIA32) of the stems of Bauhinia species on the murine breast cancer line 4T1. These fractions were used because they completely inhibited the MMP-2 and MMP-9 activity. The viability assay (MTT, Trypan blue) showed that all fractions studied decreased the viability of 4T1 cells, being the ID7 fraction the most selective. The fluorescence microscopy assay with acridine orange and propidium iodide showed that fractions increased the apoptotic cells percent. The wound closure and trans well assays were used to evaluate the migration cell, and the trans well assay with Matrigel was used to evaluate the invasion cell, wherein all fractions inhibited the 4T1 wound closure, IID10, IA19 fractions inhibited trans well migration, and ID7, IID10, and IIIA32 decreased invasion cell. Furthermore, all fractions increased the 4T1 adhesion to basement membrane components and decreasing the MMP-2 activity in the 4T1cells supernatant. In the in vivo assay, this fraction decreased the volume and weight of the tumor extracted from mice induced with 4T1 and treated with ID7, in addition to decreasing the number of lung metastases. The ID7 ESI-MS(-) characterization suggesting the presence of fatty acids, phenolic acids, and diterpene. Thus, it was found that the Bauhinia fractions tested, exhibited selective antitumor and antimetastatic activity of breast cancer.

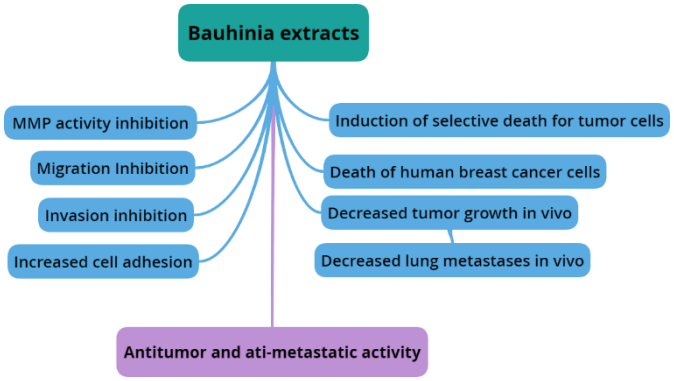


Figure: Steps to obtain *Bauhinia* fraction with antitumor and anti-metastatic activity.

Recent Publications

1. CLARK A G, VIGNJEVIC D M (2015) Modes of cancer cell invasion and the role of the microenvironment. Current Opinion in Cell Biology 36: 13-22.
2. MASSAGUÉ J, OBENAUF A C (2016) Metastatic Colonization. Nature 529: 298-306.
3. SANTOS K M, NUNES D A F, FARIA I N G, SILVA S L, RIBEIRO R I M A (2015) Inhibition of Gelatinase Activity of MMP-2 and MMP-9 by extracts of *Bauhinia ungulata* L. Bioscience Journal 31:584-590.
4. Gao X, Zhang J, Huang Z, Zuo T, Lu Q, Wu G, Shen Q (2017) Reducing Interstitial Fluid Pressure and Inhibiting Pulmonary Metastasis of Breast Cancer by Gelatin Modified Cationic Lipid Nanoparticles. ACS Appl Mater Interfaces 22.
5. FULDA S (2010) Modulation of apoptosis by natural products for cancer therapy. Planta Med 76: 1075-1079.



Biography

Kamilla Monteiro is a Biomedical from José do Rosário Vellano University (2010) and a master's degree in Biotechnology from the Federal University of São João del Rei (2013). PhD student in Biochemistry and Molecular Biology by Multicentral Program of the Brazilian Society of Biochemistry and Molecular Biology, working on the main themes: medicinal plants (*Bauhinia*) fractionation and identification of compounds; Cancer and metastasis (metalloproteinases), Alzheimer (acetylcholinesterase inhibition), Cryopreservation and culture of tumor cells and Depression (behavioral assays). She is also professor at the Biomedicine and Physiotherapy courses at the

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