The antitumoral potential of Plans-II, an acidic PLA2 from Porthidium lansbergii snake venom on human cervical carcinoma cells.

Gabriel Alejandro Montoya-Gómez1; Leonel Montealegre-Sánchez2; Nelson Rivera-Franco3; Andrés Castillo2; Eliécer Jiménez-Charriz1

1Grupo de Nutrición, Facultad de Salud, Universidad del Valle, Cali, Colombia. 2Departamento de Biología, Facultad de Ciencias Naturales y Exactas, Universidad del Valle, Cali, Colombia

1. Introduction

Cervical cancer (CC) is a malignant neoplasm originating in cervical cells, being the fourth carcinoma with more morbidity and mortality in women and occupying the ninth place in the world ranking of cancer types causing mortality (considered both sexes). About 570,000 new cases were reported in 2018, and 311,000 women die from this pathology in the world. Chemotherapeutic treatments and radiotherapy are the most used in the advanced stages of CC. However, these concomitant treatments have various side effects, affecting patients' quality of life, leading in many cases to the abandonment of medicines, which contributes to the high death rate.

One of the significant challenges for medicine is the exploration of new intervention strategies and the implementation of more effective drugs against CC and less toxic for healthy tissues. Therefore, the scientific investigation may focus on finding molecules that exclusively affect the tumor microenvironment, particularly in the inhibition of metastasis and the induction of cell apoptosis. Many molecules with these properties have been found in snake venoms, such as phospholipases A2. These toxins are highly effective in affecting the development of tumor cells of different origins. The investigations carried out indicate that this effect is not induced mainly by the sPLA2 enzymatic activity but by interactions with cell surface receptors, affecting intracellular signal transduction pathways.

Thus, the antitumoral potential of Plans-II (an Asp49-type acidic phospholipase A2 from Porthidium lansbergii snake venom) was evaluated for the first time against squamous epithelial cell line of cervical cancer Ca.Ski. Cytotoxic effect, cell cycle arrest, cell death, adhesion and migration inhibition, transcriptomic analysis, and possible interactions with membrane receptors were evaluated on Ca.Ski cells treated with Plans-II to determine its antitumoral potential on cervical cancer.

2. Experimental Design

2.1. Materials and Methods

2.1.1. Materials

2.1.2. Methods

3. Results

3.1. Cytotoxicity

3.2. Adhesion

3.3. Cell cycle

3.4. Apoptosis

4. Discussion

4.1. Cytotoxic effect

4.2. Adhesion

4.3. Cell cycle

4.4. Apoptosis

5. References

6. Acknowledgments

The authors thank Elvis Jiménez Vergas and Raúl Chávez Morales for their help in the collection of venom samples. This work was supported by the School of Basic Sciences, Faculty of Health University of the Valley.

Figures and tables are not included in the natural text representation.