

## Advanced methods for antitumoral screening applied on pharmaceutical product development

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### Abstract

Although the advances in the forms of treatment have allowed small benefits regarding survival, results are still far from being optimal and cancer remains as a significant health problem of the world. The discovery and screening of components that are capable of regulating cell proliferation, cell cycle progression, and/or apoptosis from a dietary or/and natural source is an important aspect of developing new agents that are used in cancer prevention and treatment that possess low toxicity or side effects.

The aim of this paper is to present **one of the most important steps in pharmaceutical product development, the "in vitro" screening on specific tumor cell lines** (prostate, cervix and breast), in order to set the cellular target action of active principles. In respect with the increased demand for new drugs that could raise the efficacy of tumor treatment, we applied our experimental model on the development of therapeutic solutions based on naturally occurring substances: herbal extracts having chemical configuration similar with steroid hormones and entomological preparation containing a mucopolisaccharidic complex.

The screening was performed on human tumours standardized cell line with epithelial morphology: HeLa (cervix adenocarcinoma - ATCC nr. CCL-2), Hep-2 (Human Negroid Cervix carcinoma, HeLa derivative - ECACC nr. 86030501), MCF – 7 (breast adenocarcinoma - ATCC nr. HTB-22) and DU 145 ( human prostate carcinoma - ATCC HTB-81) and explore the natural complexes effects on apoptosis, DNA synthesis and cell proliferation.

The method of analyse is flow cytometry, based on different fluorescent staining of phosphatidilserine externalisation and nuclear DNA (for early and late events of apoptosis detection), PE for cell cycle sequentiation and CFSE (carboxy fluorescein diacetat succinimidil ester) for cell proliferation.

The antiproliferative and apoptotic screening prove to be a relevant "in vitro" model, a starting point for the drug-design of a potential antitumoral agent. The application we performed (the antitumoral effect evaluation of two types of active compounds from two different natural sources: plant and animal) reveals that this "in vitro" screening is a valuable tool, a promising checking point for the start of advanced genomic and proteomic investigations of a wide range of natural compounds.

This study demonstrates the potential use of *Hedera helix* compound GSO1 in the prevention or treatment of malignant diseases, especially breast and cervix cancers and the