

Effect of natural substances from *Boswellia sacra* and *Nerium oleander* (Breastin) in colon and pancreatic cancer

Parsonidis P.¹, Vlachou I.¹, Apostolou P.¹, Papatotiriou I.¹

¹ Research Genetic Cancer Centre S.A. (R.G.C.C. S.A.). Industrial Area of Florina GR53100, Florina, Greece

Background: Colon cancer is the third most commonly diagnosed cancer and it accounts approximately 10-15% of all cancer deaths each year, while pancreatic cancer is the fourth leading cause of cancer deaths, accounting 6% of all cancer-related deaths. Natural products are becoming an important research area for drug discovery and have been used for the treatment of various diseases. They exhibit anticarcinogenic properties by interfering with development and progression of cancer. *Boswellia sacra* has been exhibited tumor-cell specific apoptosis and suppresses tumor aggressiveness in human breast cancer cell lines. *Nerium oleander* is determined to have cytotoxic effect over some types of cancer cells. The present study aimed to evaluate the outcome of treating colon and pancreatic carcinoma cell lines with the above two natural substances, *Boswellia sacra* and *Nerium oleander* (Breastin).

Methods: The products were tested with HPLC or LC-MS for identification of active substances (boswellic acids and oleandrin/oleandrogenin respectively). HCT-116 (colon carcinoma) and PANC-1 (pancreatic) cell lines were then cultured with the above substances in different concentrations for 24 and 48h. Viability assays were performed by using Methyl-tetrazolium dye (MTT) and statistical analysis followed (t-test). All the reactions were performed in triplicates, while appropriate controls were used.

Results: The active substances were detected with the analytical methods. The treatment with *Boswellia sacra* in 50 µg/ml decreased the viability of HCT116 by 50% at 24h and 48h, while in PANC-1, optimum results observed in 25 µg/ml, decreasing the cell population approximately 40-50% in both time periods. The treatment of colon carcinoma cell line with Breastin in 1 µg/ml reduced the cell population 35% at 24h, while addition in 2.5 µg/ml decreased viability up to 70% at 48h of incubation. Decrease in viability up to 50% was also observed in PANC-1 after treatment with 0.5 µg/ml at 24h and 1 µg/ml post 48h of treatment.

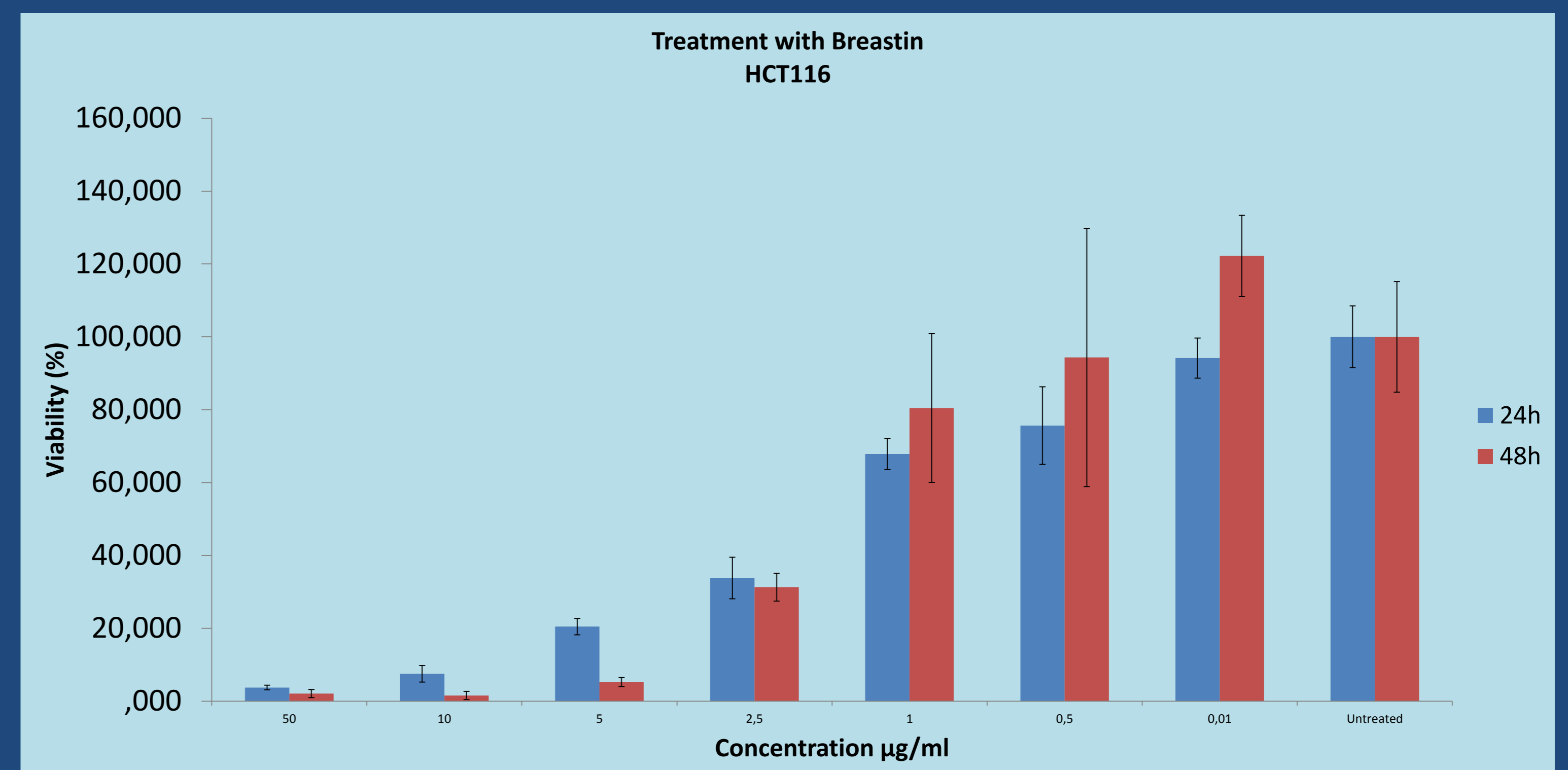


Figure 2: Viability of HCT116 (colon cancer) when treated with different concentrations of *Nerium oleander* extract at 24h and 48h

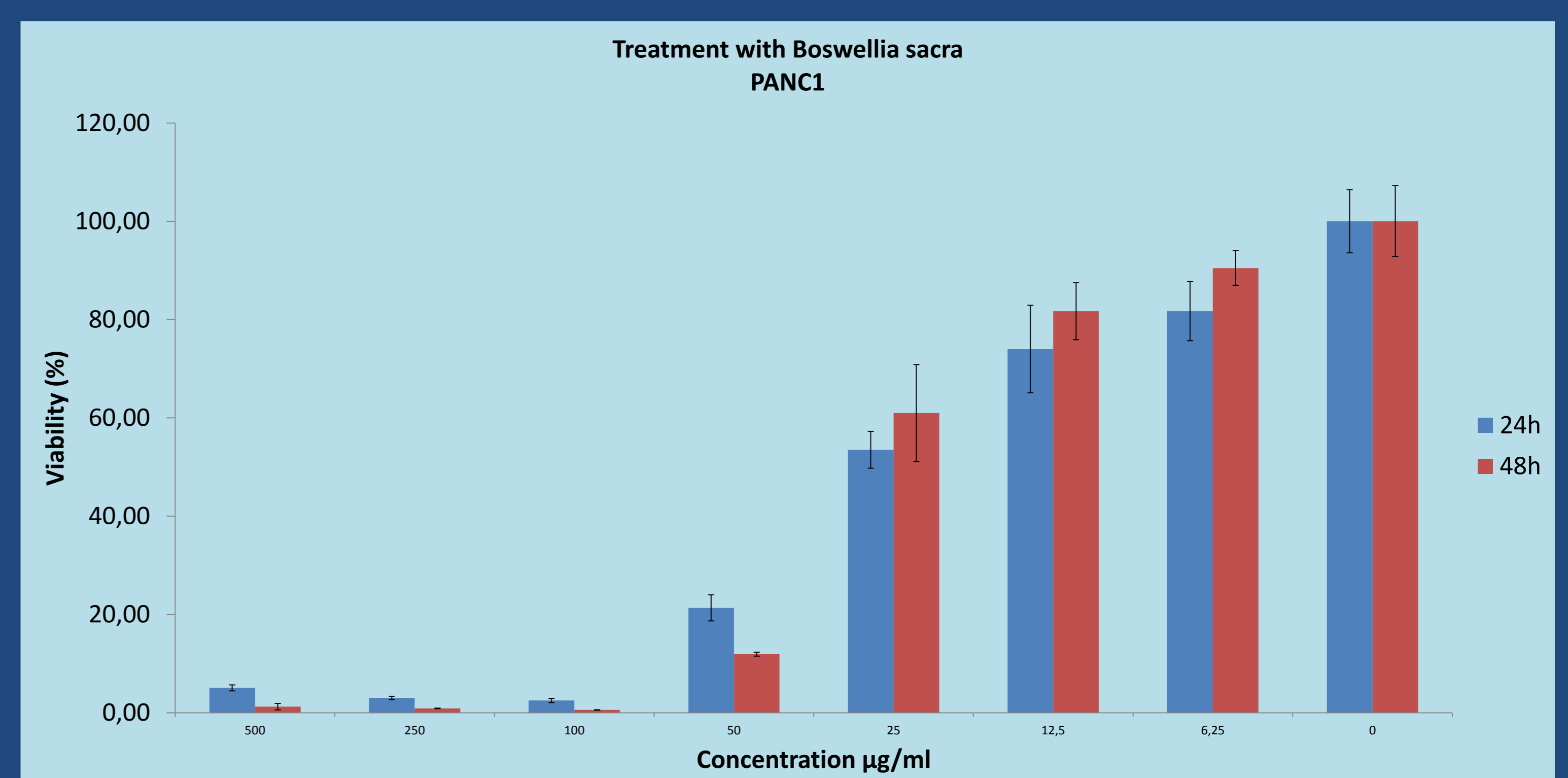


Figure 3: Viability of PANC1 (pancreatic cancer) when treated with different concentrations of *Boswellia sacra* extract at 24h and 48h

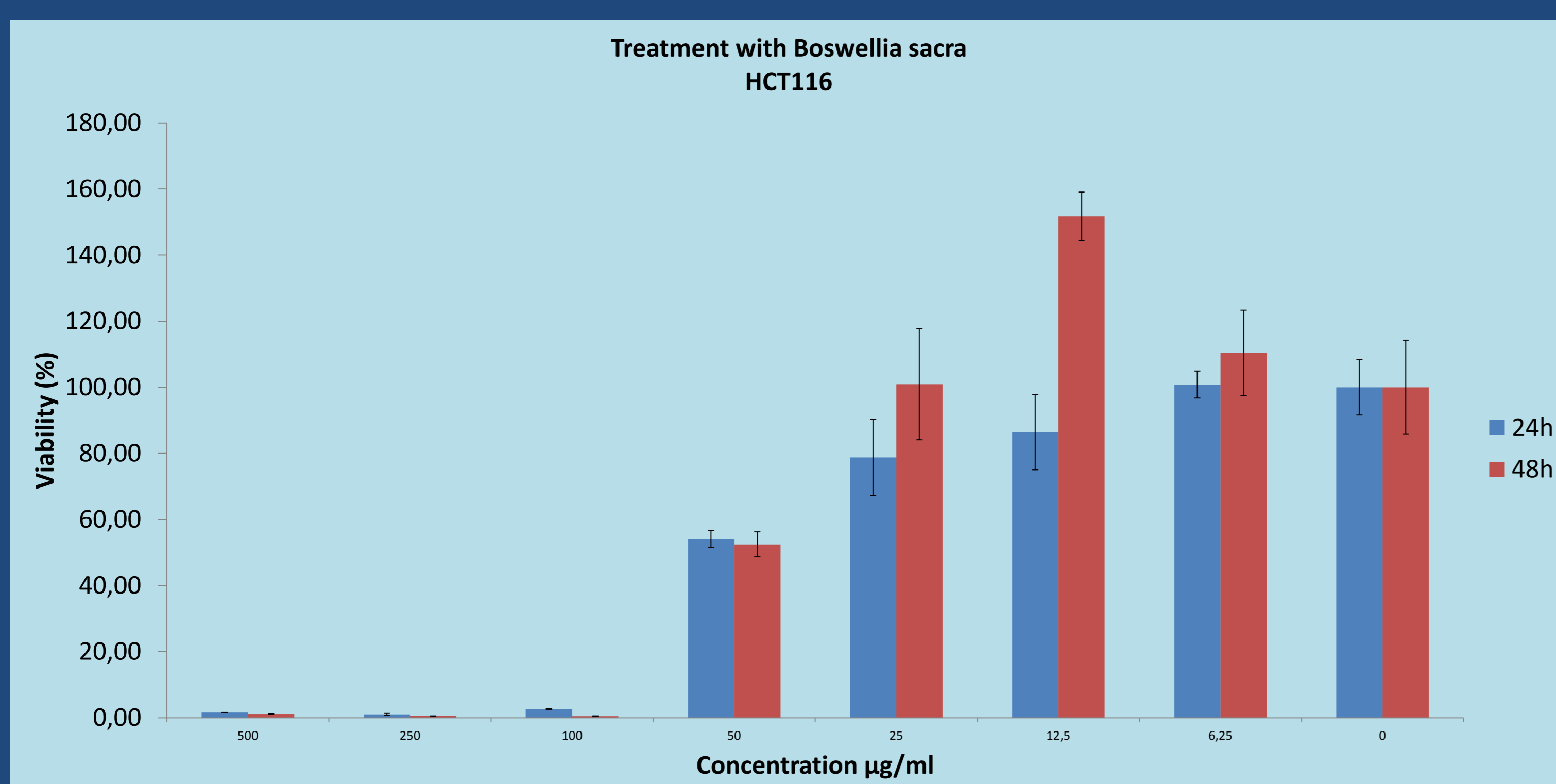


Figure 1: Viability of HCT116 (colon cancer) when treated with different concentrations of *Boswellia sacra* extract at 24h and 48h

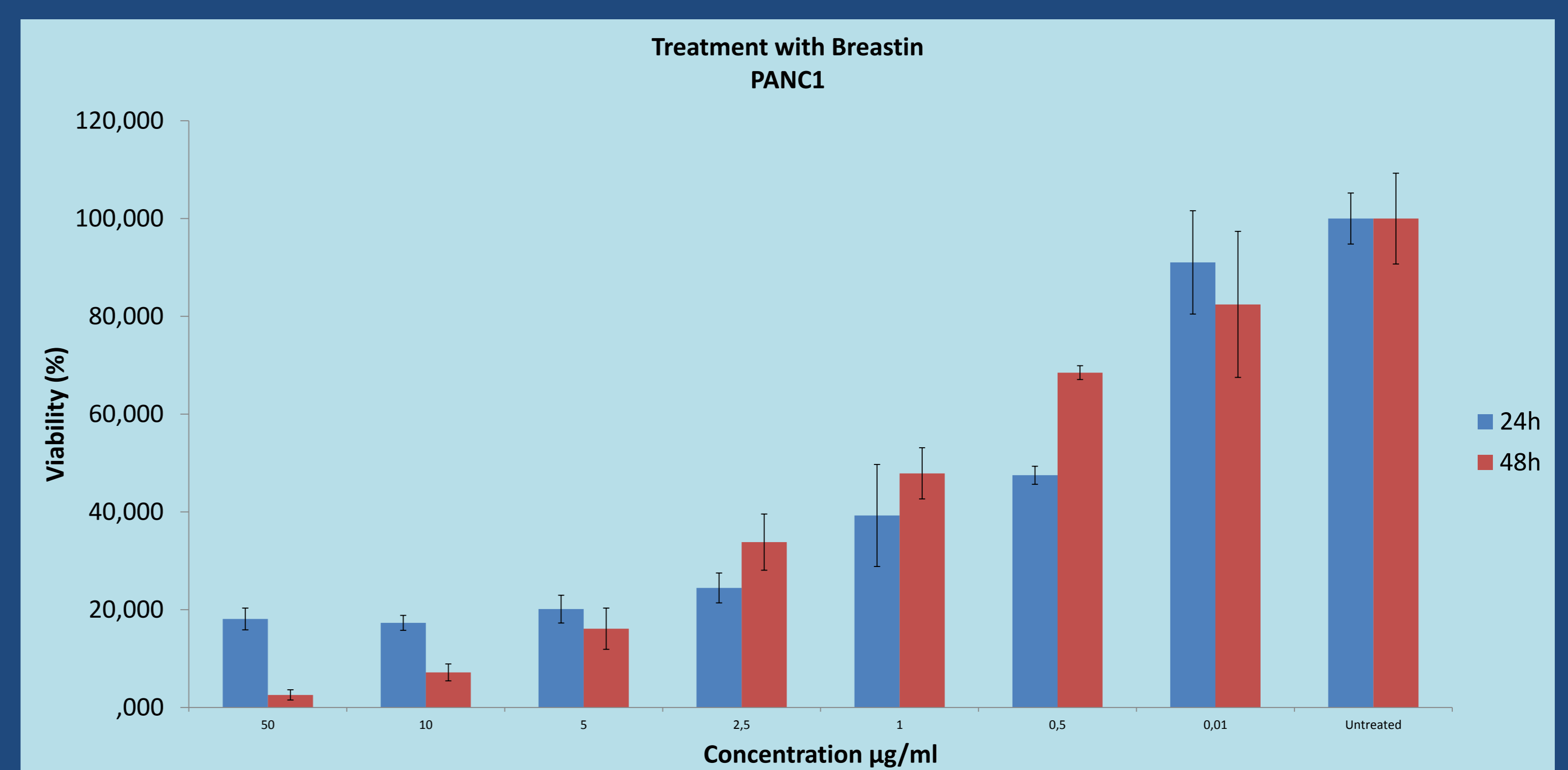


Figure 4: Viability of PANC1 (pancreatic cancer) when treated with different concentrations of *Nerium oleander* extract at 24h and 48h

Conclusions: Taking everything into consideration it has been demonstrated that *Boswellia sacra* and *Nerium oleander* (Breastin) affect proliferation of the above tested cell lines. The mechanism of action is not known, however the above substances contain molecules that might contribute to this inhibition. The study of specific molecules contained on Breastin and *Boswellia sacra*, as well as the study in more samples and other types of cancer is necessary to prove the previous concept.

Selected References:

- Suhail, M.M., Wu, W., Cao, A., Mondalek, F.G., Fung, K.M., Shih, P.T., Fang, Y.T., Wooley, C., Young, G., Lin, H.K. (2011). *Boswellia sacra* essential oil induces tumor cell-specific apoptosis and suppresses tumor aggressiveness in cultured human breast cancer cells. BMC Complement Altern Med., 11:129
- Calderon-Montano, J.M., Burgos-Moron, E., Orta, M.L., Mateos, S., Lopez-Lazro, M. (2013). A hydroalcoholic extract from the leaves of *Nerium oleander* inhibits glycolysis and induces selective killing of lung cancer cells. Planta Med., 1017-23.
- Mannino, G., Occhipinti, A., Maffei, M.E. (2016). Quantitative determination of 3-O-Acetyl-11-Keto-β-Boswellic Acid (AKBA) and other Boswellic Acids in *Boswellia sacra* Flueck (syn. *B. carteri* Birdw) and *Boswellia serrata* Roxb. Molecules, 21, 1329.
- Newman, R.A., Cisneros, A., Felix, E., Vijjeswarapu, M., Lin, Y., Yang, P., Azardi, P. (2001). Composition and preliminary pharmacology studies with Anvirzel™: an extract of *Nerium oleander*. Journal of Herbal Pharmacotherapy, 1(3)

