assay using flow cytometry. Data analysis was done using the *software* CellQuestPro.

Results and discussions Our study results demonstrated that the methanol extract of *Holothuria scabra* exhibited cytotoxic activity through inhibiting the growth of T47D cancer cells in a dose-dependent manner, start from 50 µg/mL until 500 µg/mL, with IC_{50} value of 152.98 µg/mL. The methanol extract of *Holothuria scabra* was able to stimulate 99% cancer cells to undergo apoptosis. This data warrant for further investigation on that apoptotic mechanism. The investigation is important to support cancer therapeutical strategies that focus on inducing cell death to overcome apoptosis resistance, one of the most important hallmark of cancer.

Conclusion The methanol extract of *Holothuria scabra* contains a promising anti-cancer agent that possesses cytotoxic and apoptotic effects on breast cancer cells.

PO-409 SIGNAL PEPTIDE OF PD-1 INHIBITS CANCER CELL GROWTH

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Introduction Cancer cells escape immune system surveillance by activating molecules called 'immune checkpoints', of which programmed death-1 (PD-1) and programmed death ligand-1 (PD-L1) are known representative molecules. Immune cells do not become active when the PD-1 present on their cell surface recognises the PD-L1 present on a cancer cell's surface, allowing cancer cells to evade the immune cell's attack. Immune checkpoint-blocking antibodies developed to target PD-1/PD-L1 have remarkable anti-cancer activity. However, the biological reasons why cancer cells activate PD-L1 remain unclear. In addition, there is an issue with cells, such as myocardial cells, with PD-L1 present on their cell surfaces also being affected by immune checkpoint-blocking antibodies. We focused on a signal peptide of PD-1 expressed on the immune cell surface. Our hypothesis was that the signal peptide produced as part of the production process that leads to mature PD-1 has an anti-tumour function. We evaluated whether an artificial peptide designed based on this PD-1 signal peptide had cell growth inhibition activity against human melanoma A2058 and non-small cell lung cancer (NSCLC) HCC-827.

Material and methods We chemically synthesised a conjugation peptide of the human PD-1 signal peptide (MQIPQAPWPVVWAVLQLGWR) and a cell penetrating peptide TAT (RRKKRRQRRR) and named it 'PD1SP-TAT' (MQIPQAPWPVVWAVLQLGWRRRKKRRQRRR). PD1SP-TAT was evaluated for growth inhibitory activity against A2058 and HCC-827 by WST assay.

Results and discussions The results were 95% of human melanoma A2058 growth and NSCLC HCC-827 growth were inhibited in cells treated with a concentration of 25 µM PD1SP-TAT for 48 hours.

Conclusion From these surprising results, PD1SP-TAT, based on the signal peptide of PD-1, shows remarkable anti-cancer activity against human melanoma and NSCLC, and suggests that PD1SP-TAT could be a candidate for a novel anti-cancer agent.

PO-410 CYTOTOXICITY AND GENOTOXICITY OF NEW GADOLINIUM, IRON OXIDE, COBALT FERRITE AND GRAPHENE OXIDE NANOPARTICLES ON SOME TUMOUR CELL LINES *IN VITRO*

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Introduction Nanoparticles (NPs) are increasingly used in cancer therapy as delivery agents and in the diagnosis of malignant diseases as contrast agents for magnetic resonance imaging (MRI). The aim of this work was *in vitro* assessments of Gd-NPs, Fe-NPs, CoFe-NPs and Graphene Oxide-NPs cytotoxicity and genotoxicity on some tumour and normal human cell lines.

Material and methods The investigated new nanomaterials were prepared and characterised by standard methods XRD, FTIR, SEM, TEM, AFM and MR relaxometry measurements. Cytotoxic activity of investigated compounds was performed by 72 hour MTT test. Target cells used were MDA-MB-453, HeLa and K562 malignant cells and MRC-5 was used as normal control cells. Genotoxicity of Gd-NP was evaluated by the Comet assay on the model of normal MRC-5 cells. DNA strand break levels were determined and expressed as% tail DNA.

Results and discussions All investigated nanoparticle materials exerted a dose dependent cytotoxicity towards investigated cell lines with moderate to low selectivity in their action to tumour cells in comparison to normal control cells. Concentrations inducing 50% decrease in cell survival (IC_{50}) showed that Gd-NPs possess moderate cytotoxicity and selectivity with IC_{50} value of 297 µg/mL on K562 cells and IC_{50}=740 µg/mL for control MRC-5 cells. Likewise, Fe-NPs did not show toxicity on normal MRC-5 cells (IC_{50} >1000 µg/mL), but possess moderate toxicity to all tumour cells (IC_{50}=336 µg/mL, 406 µg/mL and 682 µg/mL for K562, MDA-MB-453 and HeLa cells respectively). Graphene oxide-NPs showed very strong toxicity to all investigated cell lines and low selectivity with IC_{50} values in the range of 2.13 µg/mL (K562 cells) to 3.30 µg/mL (control MRC-5 cells). CoFe-NPs also showed strong toxicity, but to a lesser extent compared to graphene oxide (the IC_{50} values for all tested cell lines were in the range 19–40 µg/mL).Evaluation of genotoxicity by the Comet assay after treatment of MRC-5 cells with Gd-NPs showed no effect on DNA strand break levels at doses up to 750 µg/ml. The DNA is damaged only at very high concentrations applied (≥1125 µg/mL).

Conclusion Results obtained showed that Graphene Oxide-NPs and CoFe-NPs have very strong nonselective toxicity, but gadolinium and Fe nanomaterials due to a moderate selectivity in toxicity to tumour cells could be promising agents for further research and the use in the diagnostics and treatment of cancers.

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