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RESEARCH AREA

Metal nanoparticles have a great potential in cancer treatment due to a broad spectrum of anti-cancer activities. Nano-sized materials are able to accumulate in the tumor tissue owing to the fenestrated endothelium of the tumor blood vessels. Moreover, the large specific surface of nanoparticles can be functionalized with tumor-specific ligands to achieve active tumor targeting. Metal nanomaterials possess strong intrinsic anti-tumor effects and are excellent combinational partners for chemotherapeutic agents and various treatment modalities. Besides the tumor-targeting activity of nanoparticles, nano-sized materials can be used to modulate the cancer-promoting activity of other cell types, such as cancer-associated fibroblasts and tumor-associated macrophages, in the tumor microenvironment. We examine how metal nanoparticles affect the paracrine cross-talk between cells in the tumor tissue in order to attenuate tumor progression, invasion, and dissemination.

TECHNIQUES AVAILABLE IN THE LAB

Maintaining *in vitro* human cell cultures, detection of cell proliferation, *in vitro* toxicity measurements, detection of cell migration by scratch assay, invasion assays, gelatin zymography, Western blot analysis, conventional PCR, Real-time PCR, immunocytochemistry, fluorescence microscopy, isolation of primary cells, experiments on 3D cell cultures, clonogenic assay to detect the colony-forming capabilities of tumor cells.

SELECTED PUBLICATIONS

Adamecz, D. I., Veres, É., Papp, C., Árva, H., Rónavári, A., Marton, A., Vizler, C., Gácsér, A., Kónya, Z., **Igaz, N.**, & Kiricsi, M. (2025). Gold and Silver Nanoparticles Efficiently Modulate the Crosstalk Between Macrophages and Cancer Cells. *Int J Nanomedicine* **20**: 4777–4802.

Rónavári, A., Kachal, E., **Igaz, N.**, Szerencsés, B., Kutus, B., Pfeiffer, I., Kiricsi, M., & Kónya, Z. (2025). Multi-round Recycling of Green Waste for the Production of Silver Nanoparticles: Synthesis, Characterization, and Biological Activity. *ACS Omega* **10**(32): 35793–35808.

Igaz, N., Bélteky, P., Kovács, D., Papp, C., Rónavári, A., Szabó, D., Gácsér, A., Kónya, Z., & Kiricsi, M. (2022). Functionalized Mesoporous Silica Nanoparticles for Drug-Delivery to Multidrug-Resistant Cancer Cells. *Int J Nanomedicine* **17**: 3079–3096.

Kovács, D., **Igaz, N.**, Marton, A., Rónavári, A., Bélteky, P., Bodai, L., Spengler, G., Tiszlavicz, L., Rázga, Z., Hegyi, P., Vizler, C., Boros, I. M., Kónya, Z., & Kiricsi, M. (2020). Core-shell nanoparticles suppress metastasis and modify the tumour-supportive activity of cancer-associated fibroblasts. *J Nanobiotechnology* **18**(1): 18.

Igaz, N., Kovács, D., Rázga, Z., Kónya, Z., Boros, I. M., & Kiricsi, M. (2016). Modulating chromatin structure and DNA accessibility by deacetylase inhibition enhances the anti-cancer activity of silver nanoparticles. *Colloids Surf B Biointerfaces* **146**: 670–677.

Kovács, D., **Igaz, N.**, Keskeny, C., Bélteky, P., Tóth, T., Gáspár, R., Madarász, D., Rázga, Z., Kónya, Z., Boros, I. M., & Kiricsi, M. (2016). Silver nanoparticles defeat p53-positive and p53-negative osteosarcoma cells by triggering mitochondrial stress and apoptosis. *Sci Rep* **6**: 27902.