

**INTERNATIONAL RESEARCH
AND PRACTICE CONFERENCE
“NANOTECHNOLOGY
AND NANOMATERIALS”**

The NANO-2023 Conference is dedicated
to the brave men and women serving in the Armed Forces
of Ukraine, who safeguard freedom and peace in Ukraine

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The NANO-2023 Conference was organized by the Institute of Physics of NAS of Ukraine with the participation of the University of Tartu (Estonia), the Lviv Polytechnic National University, University of Turin (Italy) and Pierre and Marie Curie University – Paris 6 (France).

NANO-2023 was the 11th conference in the series of NANO-conferences initiated by the Institute of Physics of NAS of Ukraine in 2012 in the framework of FP7 Nanotwinning project. From year to year, they attract more attention and participants. In 2012, the first meeting was held in the format of International Summer School for young scientists «Nanotechnology: from fundamental research to innovations». The 2013 and 2014 conferences were organized in conjunction with the International Summer Schools for young scientists under the same title. In 2013, this event was attended by more than 300 scientists, in 2014–2017, 450 scientists took part and in 2018 it gathered above 650 participants. In 2021 conference was attended by more than 700 scientists from Ukraine, Poland, Italy, Estonia, France, Austria, Germany, Greece, Turkey, USA, Romania, Moldova, Czech Republic, Taiwan, Lithuania, Egypt, Iran, India, Algeria, Indonesia and other countries. In 2021 and 2022 the Organizer Committee has received more than 500 application forms from about 25 countries of the world each years.

The NANO-2023 conference brought together leading scientists and young researchers from many countries of the world. This year its topics were as follows: Nanobiotechnology for health-care; Nanochemistry and biotechnology; Nanocomposites and nanomaterials; Nanoobjects microscopy; Nanooptics and photonics; Nanoplasmonics and surface enhanced spectroscopy; Nanoscale physics; Nanostructured surfaces; Physico-chemical nanomaterials science.

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Gold nanosystems improve male reproductive function

Kaleinikova O., Ukrainska S., Sribna V., Voznesenska T., Blashkiv T.

Bogomoletz Institute of Physiology of the National Academy of Sciences of Ukraine of Ukraine.

Bogomoletz street,4, Kyiv-01024, Ukraine

E-mail: syana_ds@ukr.net.

Polymers with a dextran core and grafted polyacrylamide chains dextran-polyacrylamide (D-PAA) in the anionic form of D-g-PAA(PE), as a polymer matrix carrier, in particular gold nanoparticles (AuNPs) - are being actively studied.

The aim is to evaluate the effect of five treatment of gold nanosystems (D-g-PAA(PE)/AuNPs) and Quercetin on male reproductive function in mice under conditions of experimental chronic kidney disease (EChKD).

The study was performed on male and female mice with EChKD, a model of which was created by immunizing animals with kidney homogenate. AuNPs loaded (synthesized, retained) in D-g-PAA(PE) are spherical in shape, size 4-11 nm. D-g-PAA(PE) (2,0 and 10,0 mg/kg), D-g-PAA(PE)/AuNPs (1,96 and 9,78 mg/kg) was administered intravenously, five times. Quercetin (Sigma, USA) (50 mg/kg) was administered intraperitoneally, five times after the introduction of gold.

Our data suggest that under conditions of EChKD takes place disorder of male reproductive function. Under conditions of EChKD and exposure to 1.96 mg/kg of D-g-PAA (PE)/AuNPs decreased: the number of abnormal sperm, the number of necrotic cells of the testes, the number of necrotic cells of the epididymis, values of preimplantation mortality compared to such a value in conditions of EChKD. Under conditions of EChKD+D-g-PAA(PE)/AuNPs+Quercetin found: decrease in the number of abnormal sperm, increase in the number of spermatids, increase in the number of living cells and decrease in necrotic cells of the epididymis, reduction of preimplantation mortality of embryos, increase in the number of live newborns (pups) compared to such values under the conditions of EChKD. Under conditions of EChKD and exposure to 9,78 mg/kg D-g-PAA(PE)/AuNPs, male reproductive function is impaired and additional probable damage occurs, namely in the value of pre-implantation mortality compared to EChKD.

Conclusion: Treatment of 9,78 mg/kg D-g-PAA(PE)/AuNPs leads to disorder of the male reproductive system, but is not critically dangerous for therapeutic use. Whereas the treatment of 1,96 mg/kg D-g-PAA(PE)/AuNPs has possible therapeutic applications to improve male reproductive function. The effect of such gold nanosystems may reduce oxidative stress and improve sperm DNA repair, which requires further study.

Наукове видання

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Head of Organizing Committee:

Dr. Olena Fesenko, Institute of Physics of the NAS of Ukraine

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ТзОВ "Галицька видавнича спілка"
вул. Тугана-Барановського, 24, м. Львів, 79005,
тел.: (032) 276-37-99

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Друк: ТзОВ "РВФ "Поліграф-сервіс"
вул. Грабовського 11/13, м. Львів, 79008
тел.: (067) 673-85-75

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