9th Yazd International Congress and Student Award on Reproductive Medicine with 4th Congress of Reproductive Genetics

Poster Presentations

P-129

Design of a new coating agent based on graphene oxide and antimicrobial/spermicidal peptide (Sarcotoxin Pd) for condom coating: new strategy for prevention of unplanned pregnancy and sexually transmitted infections

Dehghanbaghi N[1], Zare-Zardini H[2], Soltaninejad H[3].

1. *Department of Biology, Faculty of Sciences, Science and Art University, Yazd, Iran.*
2. *Department of Sciences, Farhangian University, Isfahan, Iran.*
3. *Department of Nanobiotechnology, Faculty of Biological Sciences, Tarbiat Modares University, Tehran, Iran.*

Email: hadizarezardini@gmail.com

Background: Sarcotoxin Pd has been introduced as potent contraceptive agents in the prevention of unplanned pregnancy and sexually transmitted infections (STIs). The limitation for application of these peptides is low stability in various environments (with different pH and temperatures). Nanotechnology can be used to design new biocompatible and biodegradable system for enhancement of peptide stability, slow release, targeted delivery, maintenance of peptide's structure and function, and so on.

Objective: The aim of this study was to design of a new coating agent based on graphene oxide and antimicrobial/spermicidal peptide, Sarcotoxin Pd, for condom coating as new strategy for prevention of unplanned pregnancy and sexually transmitted infections.

Materials and Methods: Microwave method was used for synthesis of functionalized graphene oxide (GO) with antimicrobial/spermicidal peptide, Sarcotoxin Pd. Characterization was done by FTIR, TEM, and SEM microscope. Antimicrobial and spermicidal activity as well as peptides stability on functionalized GO were evaluated in comparison with naked peptides.

Results: The results approved that Sarcotoxin Pd-functionalized GO (GO-Pd) had broad-spectrum antimicrobial activities against examined pathogens, especially vaginal infections such as Candida Vulvovaginitis. This antimicrobial activity was more than pristine peptides. GO-Pd had also the higher inhibitory activity on motility and viability of sperm than pristine peptides. Evaluation of stability showed that in all examined conditions, GP-Pd had high stability and activity. But, naked peptides had low stability and activity after incubation in acidic pH and high temperatures (more than 38°C). In all tests, there was the highest significant difference between GO-Pd with naked peptides.

Conclusion: This study showed that GO-Pd had higher stability, antimicrobial activity and spermicidal activity in comparison with naked peptides. On the other hand, due to high surface-area-to-volume ratio, these synthesized nanocariers could carry a large amount of peptides on their own surfaces and easily stabilized on surface of condom for the prevention of unplanned pregnancy and especially, prevention of STIs.

Key words: *Graphene oxide, Sarcotoxin Pd, Spermicidal, Vaginal infections, STIs.*