ANALYSIS OF INVOLVEMENT OF NANOPARTICLES FULLERENE C_{60} IN REGULATION INNATE AND ADAPTIVE IMMUNE REACTIONS

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Background: Nanoparticles fullerene C60 (FC60) have offered new hope for detection, prevention, and treatment in modern medicine due to their key properties, small size, enhanced permeability, surface modification and retention effects. However, the effects of nanoparticle properties on the immune system are still being explored. The main purpose of this investigation was to assess the influence of FC_{60} on functional activity of the phagocytic cells *in vitro*, production of hemagglutinins, hemolysins and level activity of complement during the primary immune response *in vivo*.

Materials and methods: Peripheral blood (PB) from 10 healthy donors was obtained. FC_{60} was added at 0,01 and 0,1 μM/l to PB and incubated for 10 min at 37°C. Level of phagocytosis, Nitroblue Tetrazolium (NBT)-test, level of myeloperoxidase activity, zimozan-induced chemiluminescence was assayed. Peripheral blood mononuclear cells were incubated with PE-conjugated mAb to CD54 and analyzed by flow cytometry. Balb/c mice were immunized by 2% suspensions of ram red blood cells for induction of the primary immune response. Mice were treated i.p. with 50 ng of FC_{60} during 1, 3 and 6 days after induction of the primary immune response. Titre of hemagglutinins was determined by reaction of hemagglutination, titre of hemolysins – by reaction of immune lysis, activity of complement – by immune hemolysis.

Results: The results demonstrated that FC_{60} did not affect the phagocytic activity of neutrophils at any doses. FC_{60} significantly decreased level of myeloperoxiase activity in neutrophils in doses 0,01 and 0,1 μM/l. FC_{60} significantly increased the indices of the NBT-test in neutrophils in dose 0,01 μM/l. Addition of FC_{60} to peripheral blood suppressed zimozan-induced chemiluminescence in doses 0,01 and 0,1 μM/l. Moreover, FC_{60} strongly reduced level of expression CD54 on lymphocytes and monocytes in doses 0,01 and 0,1 μM/l, but did not effect on neutrophils. The study revealed that FC_{60} induced the production of hemagglutinins and hemolysins, especially in initial and maximum phase of the generation antibodies during induction of the primary immune response. Additionally, F_{C60} induced the complement system activation and enlarged its activity after induction of the primary immune response.

Conclusion: The studies showed that FC_{60} can influence on immune reactions via different mechanisms. FC_{60} negatively alter phagocytic activity of immune cells *in vitro*, but it positively influence on production of hemagglutinins and hemolysins, level activity of complement during the primary immune response in Balb/c mice *in vivo*. Thus, FC_{60} provides a potential perspective medical application because it can display immunomodulatory properties which are directed on the innate (phagocytosis and complement system) and adaptive mechanisms (production antibodies) of immune system.

Key words: nanoparticles, fullerene C_{60}, immune reactions.

DISTRIBUTION OF THE CCR5 Δ32 MUTATION IN POPULATION GROUPS IN ROMANIA

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Introduction: The CCR5 gene encodes a chemokine receptor used by HIV-1 to gain entry into CD4+ T cells. The CCR5 Δ32 mutation is a 32 base pair deletion that confers resistance against HIV-1 by introducing a premature stop codon and thus abolishing the receptor. The allelic frequency of this mutation in European populations is on average 10%, while in Indian groups the average frequency is 1%.

Methods: By means of molecular genetics techniques, respectively PCR-Simplex (Polymerase Chain Reaction-Simplex), we investigated the genotype and allelic distribution of the CCR5 Δ32 mutation in two study groups from Romania, one consisting of 166 Romanian healthy individuals and the other of 133 healthy Roma ethnics.

Results: In the Romanian population group we found 144 wild-type homozygous subjects, 21 heterozygous subjects and one subject which was homozygous for the Δ32 allele, while in the Roma ethnic group 111 subjects were wild-type homozygous and 22 heterozygous. The observed allele frequencies for the Δ32 mutation in the two study groups were 7% in the Romanian population group, respectively 8.3% in the Roma ethnics.

Conclusions: This is the first study performed on populations groups from Romania concerning the distribution of the CCR5 Δ32 mutation. At the present moment there is not a single clear explanation to why such a high frequency of the CCR5 Δ32 mutation is found in Roma ethnics and while genetic drift, population mixture, or a specific founder effect can explain in part this required to elucidate the matter.

Key words: heterozygous subjects, chemokine receptor.

STUDY OF EMBRYOTOXIC, FETOTOXIC AND TERATOGENIC PROPERTIES OF ENTOMOLOGIC DRUGS

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Introduction: Embryotoxic and teratogenic properties of entomologic drugs were studied preclinically. Studied drugs are obtained from insects Lepidoptera, at different stages of metamorphoses (Imupurin- obtained from pupae, Entoheptin-from eggs, and Imuheptin-from eggs and pupae of Lepidoptera).

Purpose and objectives: The research was conducted in two stages, with the aim: determining of embryo- development disorders (I step-antenatal, and II step–postnatal observations).

Material and methods: Initially, we tested the embryotoxic and fetotoxic activities of tested drugs in rats. Tested substances were administered in 2 ml of 0,9% NaCl solution via a gastric tube, daily, at the same time; the control group received 2 ml of 0.9%NaCl solution. Daily observations not found behavioral deviations during pregnancy in females, included in the experimental groups in comparison with the control group. In the second step we evaluated the teratogenic action of tested substances, and postnatal development in the first 60 days of descendant's life.

Results: After administration of tested drugs, rats became slightly more active for 10 minutes, with subsequent recovery. Examination of skin, mucous membranes and hairiness showed no pathological changes. Body weight in rats of all groups increased an average with 30g. On the 20th day of pregnancy studied females were euthanized. It was studied preimplantation mortality index, which determines the difference between the number of corpora lutea in the ovaries and the number of implanted sites in the uterus, which is equal to 0. Then we calculated preimplantation index equal with the ratio of preimplantation places and the number of embryos, being equal to 0. Number of descendants born by primiparous