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Development of strategies for battle against COVID-19 (a mini-project)

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Statement of the Problem: Despite of the key importance the immunity, the activated immune reaction, including by vaccines, could cause unwished effects, for instance in cases as allergies, auto-immune diseases and disorders, as well as cardio-vascular pathologies. Toxic side effects of the chemical anti-viral preparations should also be taken in consideration. So, the main goal is connected with suppression of the cellular penetration and/or replication of COVID-19, both in vitro and in vivo, by RNA-interference of respective viral genes with appropriate siRNAs.

Methodology & Theoretical Orientation: In vitro-incubated cells should be inoculated with viral strain with RNA-genome (if is possible, belonging to Coronaviridae family), which should then be treated with appropriate siRNAs against genes in the viral RNA-genome, necessary about viral penetration in the cell and/or viral replication. Subsequent evaluation on the in vivo-influence of the tested siRNAs on appropriate experimental animals, infected with the same RNA-viral strain, should further be performed.

Findings & Perspectives: Besides suppression of the virus penetration in the cell and/or its replication, adequate immunity should be supported. Possibility for production of antibodies and membrane receptor glycoproteins by non-lymphoid and non-myeloid cellular types. Because the so produced immunoglobulins/antibodies are out of the germinative centers, their functions should be controlled by low-molecular mass molecules as gangliosides. Further intra- and extra-cellular interactions between different biological molecules (protein-protein, protein-RNA, protein-DNA, protein-lipid, protein-carbohydrate, DNA-DNA, DNA-RNA, RNA-RNA, DNA-DNA, etc.), underlining these processes, should be performed. CRISPR/Cas systems as universal mechanisms, responsible about normal/non-malignant cellular differentiation, adequate immune reaction, but also of cellular ageing and death, should be investigated.

Conclusion & Significance: After performance of all steps described, evaluation on the in vivo-influence of the tested siRNAs on patients/volunteers with COVID-19 (in the first 24-48 hours post infection) could be performed.