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Mathematical model dynamics of pancreatic cancer cells with interaction of immune system. Approach by replicator quasispecies system

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Motivation and Aim: Pancreatic cancer one of the difficult problems of medicine. Development illness goes very slowly during long time in special sake (stroma) and appears at final stage. Another feature of this illness is coexistence (symbiotic) effect for cancer cells and normal cells inside stroma [1]. All this subjects considerable complicate the process of discover and treatment illness.

Methods and algorithms: Formation of pancreatic pre-cancer and cancer cells represent branching stochastic process contained 64 cells. Mathematical model considered mutation matrix, fineness landscape matrix and death rates. Each element of mutation matrix present probability of appears mutation as a result to arise next cell in sequence of cancer and pre-cancer cells. Interaction immune system and of cancer cells and symbiotic effect of coexistence are considered.

Results: Differentiated description for each species pancreatic cancer cells with help of quasispecies system make possible to investigate dynamics of all set of cancer cells and give value additional information on development illness. The result of mathematical model well agreement with experimental data.

Conclusion: Applied approach can be be used to other kinds of cancer if there exist information on mutation and proliferation of cancer and pre-cancer cells.

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References

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