

**Scientific report for the project PN-II-ID-PCE-2011-3-0571, period april 2012 –
december 2013, Stages I, II, cumulative**

Activities until this stage:

Stage I

1. Experiments to get more biological data to be used in mathematical modeling. New data on the apoptosis, proliferation and the transfer of thymocytes between main subpopulations, and the dynamics of medullary and stromal cells of the thymus.
2. Generation of a mathematical model of the first stages of thymus regeneration and the inverted CD4+ single-positive/CD8+ single-positive ratio in the regenerated thymus.

Stage II

1. Finishing the mathematical model of the first stages of thymus regeneration and the inverted CD4+ single-positive/CD8+ single-positive ratio in the regenerated thymus.

Objectives:

Stage I - to publish two ISI-indexed papers from these results with members of the project as principal authors;

Stage II – to publish one ISI-indexed, impact factor paper, from these results with members of the project as principal authors;

Results:

Stage I

1. In this stage we submitted to publication a paper that we got eventually approved on the dynamics of macrophages in the diabetic thymus. The main authors are members of the project.

Accumulation of tissue macrophages and depletion of resident macrophages in the diabetic thymus in response to hyperglycemia-induced thymocyte apoptosis.

Barbu-Tudoran L, Gavriliuc OI, Paunescu V, Mic FA.

Journal of Diabetes and its Complications. 2013 Mar-Apr;27(2):114-22.

2. We have completed and submitted to publication (at **Molecular Systems Biology**) another paper that deals with the mathematical modeling of glucocorticoid-induced thymus involution and

regeneration. All authors are members of the project.

Mathematical modeling with perturbation functions of the drug's mechanism of action on thymocyte populations during glucocorticoid-induced thymus involution and regeneration.

Daniela Zaharie , Radu Dumitru Moleriu, Lavinia Cristina Moleriu, Ioan Nicolae Casu, Alexandra Teodora Gruia, Ani Aurora Mic Virgil Paunescu, Felix Aurel Mic.

3. We have presented a paper at SYNASC 2012, the 14th International Symposium on Symbolic and Numeric Algorithms for Scientific Computing, held at Universitatea de Vest Timisoara between 26-29 septembrie, 2012. All three authors are members of the project.

- Stability analysis and its impact on the parameters estimation for a logistic growth model.

Lavinia Moleriu, Radu Moleriu and Daniela Zaharie

4. We have presented a paper at “The 13th International Conference on Mathematics and its Applications ICMA2012”, Politechnica University of Timisoara, Romania, section Probability and Statistics. Applications in Health and Clinical Research. The author is a member of the project.

Inferring evolution models from experimental data on populations of thymocytes.

Lavinia Cristina Moatar-Moleriu

Stage II

1. We published a paper in the conference volume of the Genetic and Evolutionary Computation Conference, Amsterdam, The Netherlands, July 6-10, 2013 (<http://www.sigevo.org/gecco-2013/>). The first two authors are members of the project. The paper is indexed in the main databases and is available at <http://dl.acm.org/citation.cfm?doid=2463372.2463408>

Particularities of Evolutionary Parameter Estimation in Multi-stage Compartmental Models of Thymocyte Dynamics.

Daniela Zaharie, Lavinia Moatar-Moleriu, Viorel Negru

2. We published a paper in the conference volume of the 9th International Conference on "Large-Scale Scientific Computations" June 3-7, 2013, Sozopol, Bulgaria. The first and the last authors are members of the project.

Evolutionary Estimation of Parameters in Computational Models of Thymocyte Dynamics.

Lavinia Cristina Moatar-Moleriu, Viorel. Negru, Daniela Zaharie

A handwritten signature in blue ink, consisting of a large, stylized initial 'M' followed by a cursive 'A' and 'F'.

Project manager, Dr. Mic Aurel Felix