

Galina Gramotnev

SCHOOL OF MATHEMATICS AND PHYSICS, UNIVERSITY OF QUEENSLAND, ST. LUCIA, QLD 4072, AUSTRALIA

e-mail: d.gramotnev@centre-pst.com

Dmitri K. Gramotnev

CENTRE FOR PSYCHOSOMATIC TREATMENT, GPO BOX 1272, ASPLEY, QLD 4034, AUSTRALIA

Generalised Stress: A unifying model for psychological stress and psychosomatic treatment

Mathematical description of the impacts of psychological stress and psychosomatic treatment on patients with serious immune-related diseases and conditions is both challenging and important for the development of new quantifiable and effective treatment approaches for a range of diseases and conditions, including cancers [1], myeloproliferative blood diseases [2], etc. The development of such quantitative mathematical models is impeded by the fact that the characterisation of psychological stress and psychosomatic treatment is often based upon subjective perceptions of the involved human subjects (including preservative cognition). In this paper, we introduce and justify a new model based on a concept of generalised stress that mathematically unifies psychological stress and psychosomatic (hypnotic) treatment. This model correlates the two independently and subjectively reported levels of psychological stress and psychosomatic treatment on two different arbitrary scales to an objectively measured physiological parameter platelet count. As a result, the two subjectively reported quantities are reduced to the same unit scale and mathematically unified into one new quantity called generalised stress. Excellent applicability of this model is demonstrated on an example of a 3.5 years longitudinal study of blood parameters in a patient with myelofibrosis, who was subjected to severe work-related psychological stress and psychosomatic (hypnotic) treatment. The stress and treatment were statistically shown to have a major (dominant) impact on blood platelet counts well described by an exponential dependence on cumulative levels of generalized stress. Only 12 % of the total variation of platelet counts could be attributed to factors other than psychological stress and psychosomatic treatment. The developed model will be instrumental for the quantified analysis of the impacts of psychological stress and psychosomatic treatment for patients with immune and blood disorders. It also demonstrates a unique role of platelets for neuroimmunological pathways for psychological stress and psychosomatic treatment.

REFERENCES

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