



WEB OF SCIENCE

## NEW APPROACH OF BALNEOLOGY WITHIN CONTEMPORARY DIRECTIONS OF RESEARCH

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### Abstract

**Introduction.** Nowadays classic balneology seems to be obsolete. The purpose of this presentation is to explore topics related to balneology, and bring it in the third millennium.

**Methods and materials.** To discover new scientific horizons possible to connect with balneology we have investigated different data basis with key words: entropy, energy, information theory, epigenetic, hormesis, ageing, etc. This is not a critical review.

**Results and discussions.** Physical and biochemical properties of thermal/mineral waters and peloids ask local (tegument) and general physiological adaptive response (homeostasis). To explain how balneal factors act is needed a multi- and trans disciplinary approach. Some questions need to be asked. 1. Can the evaluation of energy, entropy and information exchanges between therapeutic factors and human body increase the knowledge and understanding of balneotherapy effects on human body physiology? 2. Can balneal environment be considered an epigenetic factor? Biosemiotic entropy is an error or deviation from a healthy state and results from errors in copying functional information (mutations) and errors in the appropriate context or quantity of gene expression (epigenetic imbalance). Can balneal cure balance it? 3. Cure duration is long enough that human body receives health information to reset the disturbed parameters, and is this aspect suitable for consideration in the information theory? 4. Is hormesis a pathway to investigate? How does hormesis impact biology, toxicology, and medicine? The hormetic effect can be activated by stressors, which activate cellular signal molecules as gases, the neurotransmitter glutamate, calcium ion, tumor necrosis factor (TNF), etc. and possible by balneal course? 5. It is known that neuroendocrine and immunological responses (both humoral and cell-mediated immunity) are activated during balneotherapy. Are these mechanisms applied in prevention of diseases? 6. They are many other questions waiting for answers.

**Conclusions.** Trans- and multi disciplinary approach can lead balneology in third millennium.

**Keywords:** *balneology, entropy, hormesis, epigenetic, heat exchange.*