



WEB OF SCIENCE

## Neuroendocrine mechanism of immunomodulating effect of balneotherapy on Truskavets' SPA

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### Abstract

**Introduction.** The main therapeutic factor of Truskavets' spa is bioactive water Naftussya. It owes its name to the presence in its composition of organic substances (C organic 10-20 mg/L), common to oil (in Greek Naphta). Among them are identified paraffins 4,10-4,20; monoolefins 1,67-1,75; dienes and monocycloolefins 0,84-0,85; alkylbenzene 1,55-1,54; alkenylbenzene 0,47-0,46; esters of aromatic acids 1,32-1,33; alkyl phenols 1,14-1,14; polyaromatic hydrocarbons 0,077-0,059; oxygene-containing connections (acids) 1,12-1,14; sulfur-containing connections 0,30-0,31; alkyl naphthalenes 0,53-0,53; unidentified polyaromatic hydrocarbons 0,19-0,20 mg/L. Therefore, there are potential agonists of aryl hydrocarbon receptors, which are expressed, in particular, by immunocytes. Another active principle are autochthonous bacteria, in particular, hydrocarbon-oxidizing (500-60 cells/mL), thionic acid (40-10 cells/mL) and sulfate-reducing (7-3 cells/mL), which are able to interact with intestinal macrophages of GALT with subsequent release of cytokines, which, in turn, activate the vagus terminals and immunocytes. **Materials and Methods.** The object of observation were 44 patients with chronic pyelonephritis and cholecystitis in remission. On admission and after a 10-day course of balneotherapy, the basis of which was the use of Naftussya water (3 mL/kg three times a day), recorded parameters of immunity, heart rate variability and plasma levels of hormones (ELISA). **Results.** An analysis of the canonical correlation between changes in neuroendocrine and immune parameters (Statistica-64). Neuroendocrine root receives positive factor loads from Cortisol (0,680), VLF (0,285), Triangular Index (0,146), ULF (0,172), SDNN (0,136), Testosterone (0,116) and Triiodothyronine (0,103) instead negative loads from LFnu (-0,242), Parathyroid hormone (-0,167), Amplitude of Mode (-0,111) and LF/HF (-0,095). The immune root is represented directly by Interleukin-1 (0,413), IgA (0,256), CD22<sup>+</sup> (0,184), CD56<sup>+</sup> (0,169), Pan-Lymphocytes (0,177) and Killing Index vs Staph. aureus (0,141), instead inversely by Monocytes (-0,423), IgG (-0,393), IgM (-0,335), Microbial Count (-0,193) and Phagocytose Index (-0,147) vs Staph. aureus. As a result, the canonical correlation between changes in neuroendocrine and immune parameters was stated as very strong:  $R=0,9998$ ;  $R^2=0,9996$ ;  $\chi^2_{(440)}=640$ ;  $p<10^{-6}$ ;  $\Lambda$  Prime  $<10^{-6}$ . **Conclusion.** Immunomodulatory effect of balneotherapy is realized through the autonomic nervous and endocrine systems.

