INVESTIGATION OF THE PRESENCE OF FOOD İNTAKE-RELATED NEURONAL ACTIVATION IN NEURONS SYNTHESIZING R-SPONDIN PEPTIDES AND DETERMINING THE ROLE OF THE GLUTAMATERGIC SYSTEM IN THIS ACTIVATION

Gonca TOPAL

ORCID 0000-0003-0426-2684
BURSA ULUDAG UNIVERSITY
GRADUATE SCHOOL OF HEALTH SCEINCES
HISTOLOGY AND EMBRYOLOGY DEPARTMENT
PhD PROGRAM

GRADUATION DATE:14.02.2025

SUPERVISOR

Prof. Dr. Özhan EYİGÖR
ORCID 0000-0003-3463-7483
BURSA ULUDAG UNIVERSITY
GRADUATE SCHOOL OF HEALTH SCIENCES
HISTOLOGY AND EMBRYOLOGY DEPARTMENT
BURSA – TÜRKİYE

THESIS ABSTRACT

The aim of this thesis study was to show the effects of the glutamatergic system, which uses glutamate as a neurotransmitter, and a peripheral factor such as nutrition or glucose injection on RSPO1 and RSPO3 neurons.
RSPO1 and RSPO3 neurons localized in the SON and PVN of the hypothalamus were examined in the study and c-Fos was used as an activation marker. While a significant increase was observed in the number of neurons activated after glutamate agonist injections, the application of a specific antagonist before injections of all three agonists led to a statistically significant decrease in the number of RSPO1 and RSPO3 neurons activated in both nuclei. A significant increase was observed in the number of R-spondin positive neurons activated after nutrition or glucose injection, while it was determined that the antagonists significantly suppressed this increase. It was shown that RSPO1 and RSPO3 neurons express some of the NMDA and non-NMDA receptor subunits.

APPLICATION AREAS OF THE THESIS RESULTS

As a result, according to the obtained data, it was concluded that RSPO1 and RSPO3 neurons with anorexigenic effects may play a role in the regulation of feeding behavior and glucose metabolism, that central signals such as the neurotransmitter glutamate play a role in this regulation, and that glutamate shows its effectiveness through NMDA and non-NMDA receptors.
We believe that these findings will contribute to the basic information to be used in determining the strategies to be created for the treatment of pathological disorders such as obesity, diabetes mellitus, lipid metabolism or anorexia related to food intake.

ACADEMIC ACTIVITIES

1. Yurtseven Gok, D., Coskan, N., **Topal, G**., Hasanoglu Akbulut, N., & Eyigor, O. (2023). The Localization of R-Spondin1 and R-Spondin 3 Peptides in Rat Hypothalamus: An Immunohistochemical Study. International Journal of Morphology, 41(6), 1808–1815. https://doi.org/10.4067/S0717 95022023000601808
2. Koc, C., Aydemir, C. I., Salman, B., Cakir, A., Akbulut, N. H., Karabarut, P. L., **Topal, G.**, Cinar, A. Y., Taner, G., Eyigor, O., & Cansev, M. (2025). Comparative neuroprotective effects of royal jelly and its unique compound 10-hydroxy-2-decenoic acid on ischemia-induced inflammatory, apoptotic, epigenetic and genotoxic changes in a rat model of ischemic stroke. *Nutritional neuroscience*, *28*(1), 37–49. https://doi.org/10.1080/1028415X.2024.2344141

KEY WORDS

- ✓ RSPO1
- ✓ RSPO3
- ✓ Glutamate
- ✓ Hypothalamus
- ✓ Immunohistochemistry

CONTACT

E-MAIL:
goncatopal.1992@gmail.com

THESIS SUPERVISOR

TELEPHONE:
0224-295-40-65

E-MAIL:
oeyigor@uludag.edu.tr