

## Neuroprotective Effects of Gly-Pro-Glu-Thr-Ala-Phe-Leu-Arg, a Peptide Isolated from *Lupinus angustifolius* L. Protein Hydrolysate

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**Abstract :** GPETAFLR (Glycine-Proline-Glutamine-Threonine-Alanine-Phenylalanine-Leucine-Arginine) is a peptide isolated from *Lupinus angustifolius* L. protein hydrolysate (LPH). Herein, the effect of this peptide was investigated in two different models of neuroinflammation: in the immortalized murine microglia cell line BV-2 and in a high-fat-diet-induced obesity mouse model. Methods and Results: Effects of GPETAFLR on neuroinflammation were evaluated by RT-qPCR, flow cytometry, and ELISA techniques. In BV-2 microglial cells, Lipopolysaccharides (LPS) enhanced the release of pro-inflammatory cytokines (TNF- $\alpha$ , IL-1 $\beta$ , and IL-6) whereas GPETAFLR decreased pro-inflammatory cytokine levels and increased the release of the anti-inflammatory cytokine IL-10 in BV2 microglial cells. M1 (CCR7 and iNOS) and M2 (Arg-1 and Ym-1) polarization markers results showed how the GPETAFLR octapeptide was able to decrease M1 polarization marker expression and increase the M2 polarization marker expression compared to LPS. Animal model results indicate that GPETAFLR has an immunomodulatory capacity, both decreasing pro-inflammatory cytokine IL-6 and increasing the anti-inflammatory cytokine IL-10 in brain tissue. Polarization markers in the brain tissue were also modulated by GPETAFLR that decreased the pro-inflammatory expression (M1) and increased the anti-inflammatory expression (M2). Conclusion: Our results suggest that GPETAFLR isolated from LPH has significant potential for management of neuroinflammatory conditions and offer benefits derived from the consumption of *Lupinus angustifolius* L. in the prevention of neuroinflammatory-related diseases.

**Keywords :** GPETAFLR peptide, BV-2 cell line, neuroinflammation, cytokines, high-fat-diet

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