BAB 7
SIMPULAN DAN SARAN

7.1 Simpulan

Hasil penelitian ini menunjukkan bahwa terdapat perbedaan ekspresi IL-10 pada sel glia otak mencit antar kelompok perlakuan. Dengan demikian, hipotesis alternatif (H1) diterima dan hipotesis nol (H0) ditolak.

1. Hasil penelitian ini menunjukkan terdapat peningkatan ekspresi IL-10 secara signifikan pada sel glia otak mencit dibandingkan kelompok suplementasi serat. Peningkatan diduga trejadi sebagai bentuk respons kompensasi terhadap peradangan metabolik yang diinduksi endotoksemia metabolik. Peningkatan IL-10 berfungsi mempertahankan homeostasis neuronal melalui penghambatan aktivasi jalur proinflamasi NF-κB.
2. Hasil penelitian ini menunjukkan terdapat penurunan ekspresi IL-10 pada kelompok IO dibandingkan kelompok KN. Penurunan ini diduga terjadi karena menurunnya kebutuhan kompensasi antiinflamasi pada jaringan otak. Inulin meningkatkan produksi SCFA seperti asetat, propionat, dan butirat yang memperkuat integritas *gut barrier*, menurunkan permeabilitas usus, serta mengurangi translokasi LPS ke sirkulasi sistemik.
3. Hasil penelitian ini menunjukkan kecenderungan peningkatan IL-10 pada kelompok GO dibanding IO, meskipun tidak signifikan. Peningkatan ini diduga terjadi karena fermentasi glukomanan menjadi SCFA yang memperkuat sawar usus dan menekan jalur inflamasi seperti NF-κB. Namun, efek imunomodulator tersebut belum cukup kuat untuk meningkatkan ekspresi IL-10 pada sel glia secara bermakna.

4. Hasil penelitian ini menunjukkan terdapat penurunan IL-10 pada kelompok IG dibandingkan kelompok KN, IO, dan GO. Penurunan ini diduga berkaitan dengan perbaikan kondisi inflamasi otak melalui mekanisme regulasi imun alternatif, seperti penurunan aktivasi TLR4/NF-κB serta peningkatan sinyal Th2 dan polarisasi mikroglia ke fenotipe M2, sehingga kebutuhan produksi IL-10 oleh sel glia menjadi lebih rendah.
5. Perbandingan ekspresi IL-10 pada kelompok IO, GO, dan IG menunjukkan adanya perbedaan antar kelompok perlakuan. Ekspresi IL-10 cenderung lebih tinggi pada kelompok GO dan paling rendah pada kelompok IG. Perbedaan tersebut diduga disebabkan oleh variasi efek imunomodulator masing-masing jenis serat pangan, dan kombinasi inulin-glukomanan memberikan efek yang lebih optimal dalam menekan respons inflamasi serta menurunkan kebutuhan peningkatan IL-10 sebagai mekanisme kompensasi.

7.2 Saran

1. Di penelitian selanjutnya dapat digunakan marker yang lebih spesifik untuk menilai respons antiinflamasi sel glia, seperti Arginase-1 atau CD206 yang menandai aktivasi mikroglia tipe M2.
2. Penggunaan metode kuantitatif tambahan seperti RT-qPCR atau *Western blot* juga disarankan untuk mengonfirmasi ekspresi IL-10 secara lebih akurat, serta dilakukan pengukuran sebelum dan sesudah perlakuan.
3. Melakukan analisis perbandingan ekspresi IL-10 di usus dan di otak. Hasil penelitian ini diharapkan dapat menjadi dasar bagi pengembangan strategi

nutrisi berbasis serat pangan sebagai intervensi non-farmakologis dalam pencegahan penyakit neurodegeneratif yang berkaitan dengan diet HFHS.

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