

The Anti-Inflammatory Effect of Baicalin Through Suppression of JAK/STAT Signaling Pathway in LPS-Induced RAW 264.7 Macrophages

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SUMMARY. Baicalin, one of flavonoid extracts, was obtained from the Chinese medicinal herb *Scutellaria baicalensis*, which is frequently used as a remedy for inflammatory diseases. However, the anti-inflammatory mechanisms of baicalin have not been fully elucidated. The objective of this study is to investigate the anti-inflammatory mechanism of baicalin in lipopolysaccharide (LPS)-stimulated murine RAW 264.7 macrophages. The murine RAW 264.7 cells were treated with 100 ng/mL LPS in the presence of baicalin (0.1-10 μ M). Cell viability was assessed using the cell counting kit-8 (CCK-8) assay. The levels of interleukin-6 (IL-6) and tumor necrosis factor α (TNF- α) in the supernatants of RAW 264.7 cells stimulated with LPS were tested by enzyme-linked immunosorbent assay (ELISA). Phosphorylation levels of signal transducers and activators of transcription 1 (STAT1) and STAT3, as well as Janus kinase (JAK) 1 and 2 were measured using western blotting. Our results indicate that baicalin significantly inhibited LPS-increased RAW 264.7 cells viability. In addition, baicalin strongly decreased the production of IL-6 and TNF- α in RAW 264.7 cells stimulated with LPS. Further experiments demonstrated that baicalin attenuated the phosphorylation of STAT1 and STAT3, as well as JAK1 and JAK2 in LPS-stimulated RAW 264.7 macrophages. Taken together, our findings clearly show that baicalin suppresses the production of inflammatory mediators by downregulation of the JAK/STAT signaling pathway in LPS-induced RAW 264.7 macrophages.

RESUMEN. Baicalin, uno de los extractos flavonoides, se obtuvo de la hierba medicinal china *Scutellaria baicalensis*, que se utiliza con frecuencia como un remedio para las enfermedades inflamatorias. Sin embargo, los mecanismos antiinflamatorios de la baicalina no se han dilucidado completamente. El objetivo de este estudio es investigar el mecanismo antiinflamatorio de la baicalina en macrófagos RAW 264.7 murinos estimulados por lipopolisacáridos (LPS). Las células murinas RAW 264.7 se trataron con 100 ng/mL de LPS en presencia de baicalina (0,1-10 μ M). La viabilidad celular se evaluó usando el ensayo de conteo de células 8 (CCK-8). Los niveles de interleucina-6 (IL-6) y factor de necrosis tumoral α (TNF- α) en los sobrenadantes de células RAW 264.7 estimuladas con LPS se analizaron mediante un ensayo inmunoabsorbente ligado a enzimas (ELISA). Los niveles de fosforilación de transductores de señal y activadores de la transcripción 1 (STAT1) y STAT3, así como la quinaasa de Janus (JAK) 1 y 2 se midieron usando transferencia Western. Nuestros resultados indican que la baicalina inhibió significativamente la viabilidad de células RAW 264.7 aumentadas por LPS. Además, baicalina disminuyó fuertemente la producción de IL-6 y TNF- α en células RAW 264.7 estimuladas con LPS. Otros experimentos demostraron que la baicalina atenuaba la fosforilación de STAT1 y STAT3, así como de JAK1 y JAK2 en macrófagos RAW 264.7 estimulados con LPS. Tomados en conjunto, nuestros resultados muestran claramente que la baicalina suprime la producción de mediadores inflamatorios mediante la regulación a la baja de la vía de señalización JAK/STAT en macrófagos RAW 264.7 inducidos por LPS.

KEY WORDS: Baicalin, RAW 264.7 macrophages, inflammatory mediators, JAK/STAT signaling pathway

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