



Chemical Constituents from *Ligustrum lucidum* Differentially Promote Bone Formation and Prevent Oxidative Damage in Osteoblastic UMR-106 cells

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SUMMARY. Twelve compounds isolated from the fruits of *Ligustrum lucidum* (FLL), including four phenethanols, three secoiridoids and five flavonoids, viz. tyrosol (1), hydroxytyrosol (2), salidroside (3), acteoside (4), oleuropein (5), specnuzhenide (6), G13 (7), luteolin (8), luteolin-7-O- β -D-glucopyranoside (9), apigenin (10), apigenin-7-O- β -D-glucopyranoside (11), and apigenin-7-O-acetyl- β -D-glucopyranoside (12) were evaluated for their activity on osteoblast viability and differentiation, and the preventive effect on oxidative damage of osteoblastic UMR-106 cells by hydrogen peroxide. Compounds 3, 4, 5, 6, 7, 9, 10, 11 and 12 significantly increased the viability as well as ALP (alkaline phosphatase) activity in UMR-106 cells. Compounds 1, 2, 10 and 11 could protect osteoblasts against H₂O₂-induced cell injury, and compounds 1, 2, 11, 12 could attenuate H₂O₂ decreased the level of ALP activity on UMR-106 cells significantly. These results indicated that these compounds, such as phenylethanoids, secoiridoids and flavonoids are principally responsible for the antiosteoporotic effect of FLL.

RESUMEN. Doce compuestos aislados de los frutos de *Ligustrum lucidum* (FLL), entre ellos cuatro fenetanos, tres secoiridoides y cinco flavonoides, a saber: tirosol (1), hidroxitirosol (2), salidroside (3), acteosido (4), oleuropeína (5), specnuzhenido (6), G13 (7), luteolina (8), luteolina-7-O- β -D-glucopiranosido (9), apigenina (10), apigenina-7-O- β -D-glucopiranosido (11) y apigenina-7-O-acetil- β -D-glucopiranosido (12), se evaluaron para determinar su actividad en la viabilidad y la diferenciación de los osteoblastos, así como el efecto preventivo sobre el daño oxidativo de células osteoblásticas UMR-106 por el peróxido de hidrógeno. Los compuestos 3, 4, 5, 6, 7, 9, 10, 11 y 12 aumentaron significativamente la viabilidad, así como la actividad de ALP (fosfatasa alcalina) en células UMR-106. Los compuestos 1, 2, 10 y 11 podrían proteger contra la lesión de células osteoblastos inducida por H₂O₂, en tanto que los compuestos 1, 2, 11 y 12 podrían atenuar significativamente el decrecimiento del nivel de actividad de la ALP en células UMR-106 provocado por H₂O₂. Estos resultados indican que estos compuestos, tales como feniletanoides, secoiridoides y flavonoides son principalmente responsables del efecto antiosteoporótico de FLL.

KEY WORDS: Alkaline phosphatase, Anti-osteoporosis, *Ligustrum lucidum*, Osteoblast, Oxidative stress.

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