



Effect and Molecular Mechanism of Pomegranate Seed Oil on Postmenopausal Rat Model of Osteoarthritis†

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SUMMARY. The objective was to study the pharmacological effect of pomegranate seed oil on postmenopausal rat model of osteoarthritis and investigate its molecular mechanism and better method for developing osteoarthritis models in primates by comparing it with the modified Hulth score. Rats with different amount of estrogen deficiency was fed by combination of ovariectomized female Sprague-Dawley rats' and pomegranate seed oil for six weeks. Then they were sacrificed and the knee joint tissues were made pathological sections to observe the pathological morphological structure of femoral condylar cartilage. Expression of cartilage metabolism associated genes were also analyzed. Pomegranate seed oil showed obvious protection effect on articular cartilage in ovariectomized rats model of osteoarthritis a dosage dependent manner. Expression of matrix metalloproteinase-1 MMP1 and TIMP1 (TIMP metalloproteinase inhibitor 1) gene were downregulated accompanied with increment of pomegranate seed oil. Mechanism study showed that this could be related to MMP signaling pathway. Pomegranate seed oil can greatly benefit osteoarthritis in ovariectomized female rats. This study will lay foundation in clinical application of pomegranate seed oil in postmenopausal female osteoarthritis.

RESUMEN. El objetivo fue estudiar el efecto farmacológico del aceite de semillas de granada en el modelo de osteoartritis de rata posmenopáusica e investigar su mecanismo molecular y un mejor método para desarrollar modelos de osteoartritis en primates comparándolo con el puntaje de Hulth modificado. Ratas con deficiencia de estrógeno se alimentaron con diferentes cantidades de aceite de semillas de granada mediante la combinación de ratas Sprague-Dawley hembra ovariectomizadas y aceite de semilla de granada durante seis semanas. Luego se sacrificaron y de los tejidos de la articulación de la rodilla se hicieron secciones patológicas para observar la estructura morfológica patológica del cartílago condilar femoral. También se analizó la expresión de genes asociados al metabolismo del cartílago. El aceite de semilla de granada mostró un efecto de protección obvio sobre el cartílago artrodial en ratas ovariectomizadas modelo de osteoartritis de una manera dependiente de la dosis. La expresión de la metaloproteínasa de matriz MMP-1 y el gen TIMP1 (inhibidor de la metaloproteínasa TIMP1) fueron regulados negativamente acompañados con un incremento de aceite de semilla de granada. El estudio del mecanismo mostró que esto podría estar relacionado con la vía de señalización de MMP. El aceite de semilla de granada puede beneficiar enormemente a la osteoartritis en ratas hembras ovariectomizadas. Este estudio sentará las bases en la aplicación clínica del aceite de semilla de granada en la osteoartritis femenina posmenopáusica.

KEY WORDS: cartilage metabolism, gene expression, molecular mechanism, osteoarthritis, estrogen, pomegranate seed oil.

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