

## News & Comments

# Effect of Diosmin on Inflammatory Response

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Chondrocytes are the sole cellular component of articular cartilage, responsible for the creation of a significant turnover volume of Extracellular Matrix (ECM) components as well as the maintenance of tissue homeostasis. Chondrocyte dysfunction has been linked to the development of degenerative illnesses such as osteoarthritis. In India, over 80% of the population is plagued by osteoarthritis.

OA is a Rheumatic Musculoskeletal Disorder characterized by increasing cartilage deterioration, synovial inflammation, osteophyte production, joint space narrowing, and subchondral sclerosis.

Diosmin (diosmetin 7-O-rutinoside), a flavone glycoside of diosmetin acquired from citrus fruit peels as a dietary supplement known for its powerful anti-inflammatory and free radical scavenging activities, is obtained from citrus fruit peels. Flavonoids, particularly diosmin, are widely used in biochemistry and pharmacology for their anti-inflammatory properties in vivo and in vitro. The present study was aimed to demonstrate in vitro anti-osteoarthritic, the chondroprotective potential of diosmin on IL-1 $\beta$ -induced inflammatory response in primary rat chondrocytes.

## MATERIALS AND METHODS

Diosmin, type IV collagenase, IL-1 $\beta$  and kits for NO, PGE<sub>2</sub>, MMP1, MMP13, TNF- $\alpha$ , IL-6 and COX-2 were obtained from Sigma-Aldrich, USA. Roche, Basel, Switzerland, provided Pronase. Gibco Inc., New York, USA, provided Dulbecco's Modified Eagle's Medium and fetal bovine serum. PRCs were extracted from the knee joints of 4-week-old Sprague-Dawley rats and enzymatically digested with 10 g LG1 of pronase and 1 g LG1 of type IV collagenase for 30 minutes and 6 hrs, respectively, at 37 °C. The isolated chondrocytes were planted at a density of 510<sup>3</sup> cells per well in a 96-well microplate. The nitrite contents in the supernatant cell were estimated spectrophotometrically using Griess Reagent (GR).

## DISCUSSION

Chondrocytes are cellular cartilage components that, under normal conditions, are responsible for maintaining ECM and regulating anabolic and catabolic metabolism. Commonly used pharmacological treatments for the management of individuals with OA, such as oral nonsteroidal anti-inflammatory medications (NSAIDs), are frequently accompanied by substantial side effects. Diosmin is a bioactive flavonoid extracted from plants that have been shown in various studies to have anti-inflammatory activities. Inflammatory cytokines have a primarily negative influence on articular cartilage, and various studies have found that the activity of IL-1 $\beta$  inhibits chondrocytes in the context of ECM component



formation and interferes with the creation of major structural proteins like Type-II collagen and aggrecan. Diosmin was reported to drastically lower inflammatory mediators such as NO and PGE2 in PRCs.

Diosmin reduced acetic acid-induced inflammatory reaction in rat colon in vitro anti-inflammatory research by suppressing inflammatory and oxidative stress markers<sup>25</sup>. As a result, the current study's drop-in TNF- $\alpha$  and IL-6 levels could be attributed to the downregulation of proinflammatory genes in diosmin-treated PRCs.

## **CONCLUSION**

The data show that diosmin may have a chondroprotective effect in the IL-1 $\beta$ -induced inflammatory response. Furthermore, research should provide a clear picture of the molecular pathways underpinning diosmin's effects on chondrocytes, making it a possible candidate for the development of new therapeutic medications soon.

## **JOURNAL REFERENCE**

Wu, C., C. Liang, J. Sun, Z. Zhang and X. Pan, 2022. Effects of diosmin on IL-1 $\beta$ - induced inflammatory response in primary rat chondrocytes. *Int. J. Pharmacol.*, 18: 667-672.

## **KEYWORDS**

Diosmin, primary rat chondrocytes, anti-inflammatory, chondroprotective activity, IL-1 $\beta$

