Exploring the regenerative and anti-inflammatory properties of oat-derived avenanthramides in human keratinocytes

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A. Díaz Yuste[I,II,III], B. Sánchez Gómez[I,III], J.M. Mora Rodríguez[I,III], N. Muñoz Almagro[II], C. Julio González[II], I. Díaz-Laviada Marturet[I,IV], O. Hernández-Hernández[II], A. Bort Bueno[I,III]

[I]University of Alcalá, Alcalá de Henares, Spain, [II]CSIC-UAM - Food Science Research Institute (CIAL), Madrid, Spain, [III]Castilla la Mancha Health Research Institute, Castilla la Mancha, Spain, [IV]Chemical Research Institute "Andrés M. del Río" (IQAR), Alcalá de Henares, Spain

Oat (Avena sativa) is a widely consumed whole grain, appreciated for its numerous health benefits. Within its complex phytochemical composition, low molecular weight phenolic alkaloid compounds known as avenanthramides (Avns) stand out. These compounds are present in oats at approximate concentrations of 300 parts per million (ppm), and various studies have observed potent antioxidant activity in a variety of cell types.

In addition to their antioxidant action, the potential of avenanthramides has been investigated in other aspects related to cellular health, including their possible role in cell regeneration. Previous studies suggest that these molecules may be involved in cellular regeneration processes, although further research is required to fully understand their mechanisms. In this study, we aim to explore in depth the impact of avenanthramides on cell regeneration and their anti-inflammatory effect in human HaCaT keratinocytes. Our results have shown that cells treated with some of the avenanthramides were able to reduce the levels of secreted and messenger RNA of different proinflammatory interleukins such as tumor necrosis factor-alpha (TNF-α), interleukin-6 (IL-6), and interleukin-1 beta (IL-1β), after inducing an inflammatory state with lipopolysaccharide (LPS). These findings demonstrate that avenanthramides have anti-inflammatory effects that can reduce inflammation in the skin, which is important to facilitate wound healing and cell regeneration. To further evaluate the effect of avenanthramides, we determined the levels of cell proliferation in keratinocytes treated with Avns and performed wound closure assays. Together, these results demonstrate that avenanthramides function as anti-inflammatory agents in human keratinocytes, suggesting their potential therapeutic utility in skin regeneration and wound healing.