NEW TOOLS TO IMPROVE THE DIAGNOSIS AND TREATMENT OF EARLY ATHEROSCLEROSIS

Summary:

Cardiovascular diseases (CVDs) are the leading cause of death worldwide, with atherosclerosis (AT) being its main determinant. Currently, AT prevention is based on traditional scores that, however, fail to identify individuals at risk at early stages. The exact prevalence of subclinical atherosclerosis is impossible to determine, although it has been estimated in the USA that 50% of men and 64% of women who died of sudden cardiac death did not have a previous manifestation of the disease and most of them were not considered high risk according to the Framingham score.

Subjects that suffer from CV events despite pharmacotherapy or those that are intolerant to it, emphasize the need for alternative treatments to be explored.

CNIC researchers have discovered a metabolite as biomarker to identify individuals at risk at early stages, and the use of antagonist to this metabolite as new tool to improve the treatment of early AT. This treatment will be effective not only for AT, but also for autoinflammatory diseases.

Innovative aspects:

Despite advances in prevention/therapy, the proportion of the population living with disabilities and chronic illness after a CV event has risen over the years, highlighting the need to intervene early in the apparently healthy population. Therefore, there is a need to develop biomarkers that can predict AT at early stages easily.

On the other hand, lipid-lowering therapy has been used for decades in AT, with statins being the therapy of choice both in primary and secondary prevention for cardiovascular diseases. However, some subjects still have cardiovascular disease risk following statin therapy, despite achieving LDL-cholesterol targets. Alternative pharmacological agents have been proposed over the years to address this limitation, most of them targeting lipid metabolism and also anti-inflammatory drugs. However, the number of adverse effects, the cost and the need of parenteral administration have limited their use to specific cases and generally in combination with statins.

The use of the antagonists to this metabolite provides a novel therapy based on a different metabolic pathway, giving an alternative to the subjects not responding or intolerant to lipid-lowering therapy.

Competitive advantages:

- The use of antagonist to the present metabolite offers the possibility of a personalized therapy for individuals that are more likely to benefit from the inhibition of this specific pathway.
- The treatment, that acts on a pathway unexplored in AT, in combination with current treatments, has the potential to increase the efficacy of AT therapy as well as reducing adverse effects.
- The product is proposed for those patients that are non-responders to the current treatments, which represents more than 50% of the population in the case of statins.
- The use of the metabolite allows the diagnose atherosclerosis at a subclinical stage, in fact subjects with high bloodstream levels of this metabolite in our cohort of healthy volunteers account for 33% of those with subclinical AT.

Key words: atherosclerosis, autoinflammatory diseases, autoimmune diseases.

Technology type: atherosclerosis, diagnostic, therapy.

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Stage of development: tested in animal models.

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