Science Translational Medicine: A hospital imaging technique used in cancer care improves the monitoring and treatment of atherosclerosis

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El ^{18}FDG-PET is a type of positron emission tomography that measures how much energy the body's cells consume.

Scientists at the *Centro Nacional de Investigaciones Cardiovasculares* (CNIC) have shown that ^{18}FDG-PET, an imaging technique widely used to study other conditions, can also be used to monitor atherosclerosis by measuring cellular metabolism within arterial plaques. The findings, published in *Science Translational Medicine*, could improve the clinical management of this disease and accelerate the development of new treatments.

Atherosclerosis—the underlying cause of most heart attacks and strokes—is a silent disease that progresses over many years without symptoms. The disease is characterized by the accumulation of fatty deposits, cells, and other materials in the walls of arteries, where they reduce blood flow and can eventually rupture, triggering serious cardiovascular events. While treatments are available to slow disease progression, it is still difficult to determine if a treatment is working in individual patients.

^{18}FDG-PET (fluorodeoxyglucose positron emission tomography) is a nuclear imaging technique that uses a radioactively labeled glucose analog to detect tissue metabolic activity.

The new study demonstrates that the ^{18}FDG-PET signal reflects the metabolic activity of atherosclerotic plaques, rather than merely indicating inflammation, as was previously believed.

To reach this conclusion, the research team developed an experimental model of advanced atherosclerosis in genetically modified animals and was able to partially reverse disease progression using a diet and drug-based intervention similar to strategies used in clinical care.

As the disease regressed, the ^{18}FDG-PET signal declined in parallel with the reduced expression of genes linked to glucose metabolism in various plaque cell types, including macrophages, lymphocytes, and smooth muscle cells.

"The ^{18}FDG-PET signal reflects the activity level of the cells within atherosclerotic lesions and can therefore serve as a sensitive tool for evaluating treatment efficacy and disease progression risk," explains CNIC researcher Paula Nogales, lead author of the study together with Jacob Bentzon, of Aarhus University (Denmark) and head of the Experimental Pathology of Atherosclerosis group at the CNIC.

This discovery opens the door to using a widely available hospital imaging technique to improve clinical monitoring of atherosclerosis and speed the development of new therapies for this silent but potentially deadly disease.

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- *Nogales, P., Velasco, C., González-Cintado, L., Sharysh, D., Mota-Cobián, A., Izquierdo-Serrano, R., Torroja, C., del Rio-Aledo, D., Morales-Cano, D., Mota, R. A., Benguría, A., Dopazo, A., Sánchez-Cabo, F., Vázquez, J., España, S., Carramolino, L., Mateo, J., & Bentzon, J. F. (2025). Atherosclerotic disease activity is associated with glycolytic enzyme expression across multiple cell types and is trackable by FDG-PET. Science Translational Medicine. https://doi.org/10.1126/scitranslmed.ado6467*

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