

Molecular imaging provides fast and effective diagnosis for patients with fever of unknown origin

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Research presented at SNM's 58th Annual Meeting highlights molecular imaging's diagnostic potential for patients with fever of unknown origin. Persistent fever can be a warning sign for a range of diseases that could be dangerous if left untreated. A single, full-body molecular imaging scan may give physicians everything they need to narrow down the cause and determine appropriate treatment.

"[Molecular imaging](#) is used widely throughout the world for oncology, as well as cardiology and neurology, but our research shows that it could be the new frontier for the evaluation of inflammatory disease," says Kozuo Kubota, MD, PhD, chief of [nuclear medicine](#) at the National Center for Global Health and Medicine in Tokyo, Japan. "If confirmed by further study, FDG-PET may one day be used as an initial, noninvasive diagnostic tool helping clinicians understand and evaluate fever of unknown origin."

When an individual's temperature reaches 101 degrees Fahrenheit on and off for at least three weeks and [health care providers](#) cannot diagnose the cause, the patient is considered to have a fever of unknown origin. Research suggests that fever helps fight off infections, and treating the fever without knowing the cause may reduce the body's ability to deal with possible infection. As a result, patients undergo numerous tests to narrow down the possible causes, such as infections (tuberculosis, mononucleosis, HIV, pneumonia, meningitis), cancer

(leukemia, Hodgkin's disease) or collagen vascular disease (Takayasu aortitis).

This study focuses on the use of positron [emission tomography](#) (PET) in conjunction with an injected [medical isotope](#) called fluorodeoxyglucose (FDG) to determine the cause of the fever of unknown origin. This [radiotracer](#) is bound with a glucose analog that is metabolized by the body as energy. Investigators are using FDG-PET to create a visual map of inflammatory disease by targeting the abnormal metabolism of FDG, which points toward the [cellular processes](#) causing patients' fever. Physicians can use the information gleaned from FDG-PET scans to guide appropriate treatment, including biopsy or sampling for pathological or bacteriological diagnosis. In the long run, molecular imaging may improve patients' prognosis as well as cut the total cost of care.

In this multi-center retrospective study, 81 patients across six institutions underwent FDG-PET imaging for the evaluation of fever of unknown origin. The use of FDG-PET was then analyzed for its diagnostic performance, ability to provide additional information and clinical impact on therapeutic decisions. Diagnoses were split between four categories: infection; autoimmune hypersensitivity; tumor or granuloma, which is a tumorous mass that develops as a result of inflammation; and all other diagnoses. According to results of this study, FDG-PET may lead to higher diagnostic efficacy for the evaluation of fever of unknown origin, especially in the case of infection and granuloma, and hospitals dedicated to the treatment of these [inflammatory diseases](#) show the greatest benefit from FDG-PET imaging.

More information: Scientific Paper 16: K. Kubota, Y. Nakamoto, N. Tamaki, H. Fukuda, U. Tateishi, M. Morooka, K. Ito¹, R. Minamimoto, K. Murakami, National Center for Global Health and Medicine, Tokyo, Japan; Kyoto University, Kyoto, Japan; Hokkaido University, Sapporo,

Japan; Tohoku University, Sendai, Japan; Yokohama City University, Yokohama, Japan; Keio University Hospital, Tokyo, Japan; "Fever of unknown origin (FUO): A Japanese multi-center study with FDG-PET," SNM's 58th Annual Meeting, June 4-8, 2011, San Antonio, TX.

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