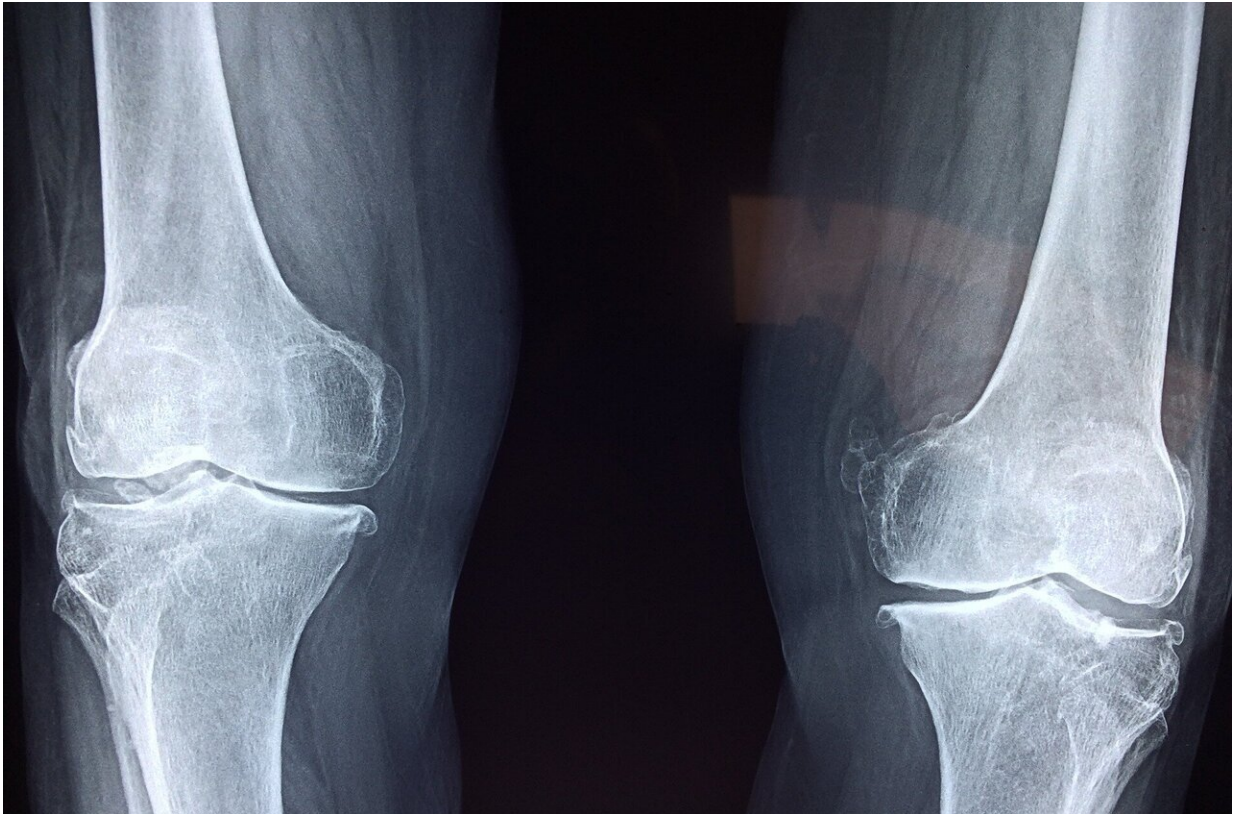


Visionary bone damage study

April 7 2021



Credit: CC0 Public Domain

A novel way to pinpoint and illuminate bone damage promises to make X-rays more efficient at diagnosing bone and other injuries, Flinders University researchers say.

The new technique, looking at potential biomedical applications of an

ancient inorganic salt-based aggregation induced emission (AIE) radioluminescence material, could open new frontiers in medicine including X-ray dosimetry, bioimaging and advanced applications such as optogenetics, says Professor Youhong Tang, from Flinders University's College of Science and Engineering.

The review article, published by Professor Tang, postdoctoral student Dr. Javad Tavokoli, colleagues in Hong Kong and Australian technology company Micro-X and, examined the potential of the AIEgen luminogens (AIEgens) in deep tissue imaging. The study used X-ray testing provided by Adelaide-based Micro-X.

"We were able to use Micro-X advanced X-ray machines at the Tonsley Innovation District to show the benefits of this AIEgen system which can be excited by X-ray (as the radioluminescence emitter) and UV light (as the photoluminescence emitter) compared to current AIEgens which mostly only act as the photoluminescence emitter," he says.

"The study highlighted the disadvantages of autofluorescence, poor signal-to-noise ratio, and poor tissue penetration depth of traditional photoluminescence emitters which could be elegantly solved by these radioluminescence luminogens," says Professor of Mechanical and Materials Engineering, Dr. Tang.

"Not only do they pinpoint bone and soft tissue damage for better diagnosis and treatment but we suggest further studies could see these AIE-based materials with multifunctionalities used for improved drug delivery, biosensors, bioimaging, and tissue engineering."

Lead author on the journal article in *Aggregate*, Dr. Tavokoli, now based at the Centre for Health Technologies at University of Technology Sydney, says the next generation of fluorescent gels could also capitalize on additional light-emitting properties making them attractive for

different applications.

The latest work not only explores a series of inorganic AIE systems but also "fundamentally helps to understand both the unconventional organic and inorganic clusteroluminescence phenomena, Professor Tang concludes.

More information: Zheng Zhao et al, Revisiting an ancient inorganic aggregation-induced emission system: An enlightenment to clusteroluminescence, *Aggregate* (2021). [DOI: 10.1002/agt2.36](https://doi.org/10.1002/agt2.36)

Provided by Flinders University

Citation: Visionary bone damage study (2021, April 7) retrieved 9 September 2024 from <https://medicalxpress.com/news/2021-04-visionary-bone.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.