Novel applications of multiphoton absorption for the detection of Alzheimer´s disease-linked amyloid aggregates and biomaterials for blood amyloid fibril capture systems.

https://neurodegenerationresearch.eu/survey/novel-applications-of-multiphoton-absorption-for-the-detection-of-alzheimers-disease-linked-amyloid-aggregates-and-biomaterials-for-blood-amyloid-fibril-capture-systems/

Name of Fellow

Piotr Hanczyc

Institution
Funder
Contact information of fellow
Country

Sweden

Title of project/programme

Novel applications of multiphoton absorption for the detection of Alzheimer´s disease-linked amyloid aggregates and biomaterials for blood amyloid fibril capture systems.

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The project/programme is most relevant to:

Alzheimer's disease & other dementias

Keywords

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Research Abstract
Based on results obtained during my PhD in relation to the use of multiphoton absorption for

analyzing dye-linked DNA and proteins I propose to expand this technology to the analysis of protein aggregates, e.g., amyloid fibrils in medical and biomaterial contexts. Nonlinear optics has the possibility to detect and diagnose amyloid fibril formation in the brains of persons with suspected Alzheimer´s or Parkinson´s disease, with potentially enormous benefits to patients and society. Importantly, high-intensity light in the infrared region of absorption does not damage cells and tissues during long-duration irradiation, it does not require the use of chemical labels, and reduces the need for surgical intervention. Amyloid fibrils are also becoming an attractive biomaterial based on their ability to assemble synthetic molecules upon fibrilization. Tissue-biocompatible non-toxic polymers with affinity to amyloids represent a class of nano-designed compounds that can successfully replace standard drugs and pharmaceutics used as disease inhibitors.

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