INFRARED FLUORESCENT PROTEASE REPORTERS FOR DEEP TISSUE IMAGING

Published date: March 28, 2017

Technology description

Scientists at UCSF have developed an infrared fluorescent imaging reporter, iProtease, for the detection of protease activity in cells and animals. The reporter becomes fluorescent only when activated by a protease, creating better contrast than GFP-based fluorescence resonance energy transfer-based systems, as well as fluorescent dye-based labeling systems. The iProtease system is versatile and can be easily used to design specific protease reporters by genetically designing their cleavage sequence into the iProtease construct. It has been successfully used in designing the executioner caspases (caspase 3 and 7), TEV protease and hepatitis C virus (HCV) NS3/4A protease. These fluorogenic protease reporters have successfully and specifically detected caspase 3/7, TEV protease, and NS3/4A protease activity in live cell systems as well as in small animals.
This invention includes the design and use of protease imaging reporters which can be detected in deep tissue. These can be used to monitor the effects of protease inhibitors, proteases and protease mediated processes including apoptosis related to the treatment of disease states such as cancer.

Data Availability
Under NDA/CDA

Related Materials
To, T.-L., Piggott, B. J., Makhijani, K., Yu, D., Jan, Y.-N., & Shu, X. (2015). Rationally designed fluorogenic protease reporter visualizes spatiotemporal dynamics of apoptosis in vivo. PNAS, 112(11), 3338–3343.

Additional Technologies by these Inventors
A Novel Reversible Fluorescent Protein Complementation Assay for Imaging of Protein-protein Interactions

Application area

Protease inhibitor drug screening

Research tool for monitoring protease activity in live cell and animal systems
Cell lines and transgenic animals can be created expressing the imaging reporter

Advantages

Proteases play key roles in many diseases, such as cancer, HIV, HCV, Parkinson’ s disease, and Huntington’ s disease. The ability to better monitor protease activityin vivowould lead to improved treatments and treatment outcomes. Current commercially available protease assays rely on systems whereby protease cleavage causes a loss of quenching signal and result in high background. However, iProtease, a genetically encoded system which uses infrared fluorescent proteins, results in a gain of signal upon proteolysis. Additional advantages of this invention are:
Noexogenous molecules such as chemical dyes
Protease specificity
Safefor biological assays
Improvedcontrast over fluorescent dye-based labeling systems
Visualizeprotease activity in the deep tissue of live animals
Facilitate drug discovery screenings of protease inhibitors in animal models
Tissue-specific and whole-animal imaging optimization

Institution

University of California, San Francisco

Inventors

Tsz-Leung To
Xiaokun Shu

联系我们

叶先生

电 话：021-65679356

手 机：13414935137

邮 箱：yeyingsheng@zf-ym.com