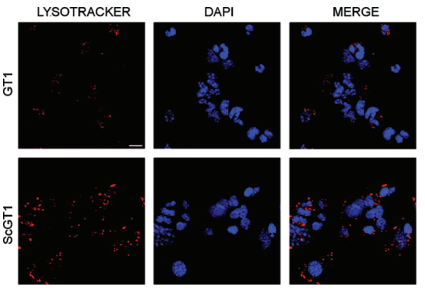
Prion-Infected Cells

Certain neurodegenerative diseases are associated with the build-up of infective prions. Didonna et al. (DOI: 10.1021/cn1000952) use infrared microspectroscopy to examine a prion-infected cell model. By comparing prion-infected cells to uninfected ones, the authors discover several dramatic hallmarks of prion diseases. For the first time, a mapping of lipid rearrangement in infected cells is described.

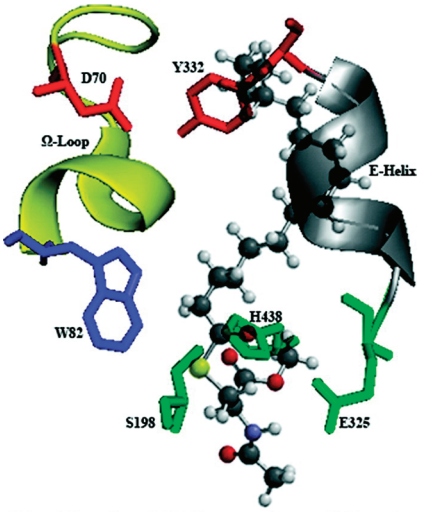
In addition, the authors demonstrate how infrared microspectroscopy can be used to detect minor biochemical perturbations such as a different protonation grade of acidic amino acids in prion infected cells. Finally, the authors show that this technique is adequately sensitive in discriminating between between diseased and healthy cells.



Targeting Multiple Sclerosis

Multiple sclerosis is a chronic condition in which there is loss of myelin in the brain. This leads to neurological disability. However, the reason for the loss of myelin is not currently clear. Elevated levels of the enzyme butyrylcholinesterase are found in brain lesions associated with multiple sclerosis. One of the components of myelin is proteolipid protein that contributes to myelin structural integrity. Proteolipid protein has long chain cysteine thioesters that provide structural integrity, and loss of these thioesters leads to loss of myelin.

To examine whether butyrylcholinesterase contributes to the myelin loss, Pottie et al. (DOI: 10.1021/cn100090g) synthesized and analyzed cysteine thioester analogues of this large protein. The authors discovered that cysteine thioesters undergo hydrolysis in the presence of butyrylcholinesterase and that this enzyme might play a role in destabilizing myelin in multiple sclerosis. In sum, butyrylcholinesterase might represent a novel target in the design of drugs for combating multiple sclerosis.



DOI: 10.1021/cn200014n | ACS Chem. Neurosci. (2011), 2, 115–115