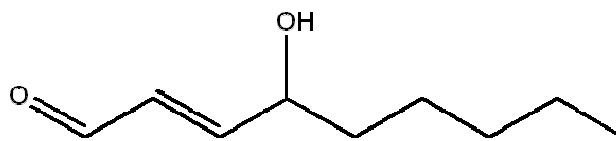




ADSense

BIOSENSOR FOR ALZHEIMER'S DISEASE

ADSense is the **Biosensor for Alzheimer's disease**. As in Alzheimer's disease Beta-amyloid concentration increases in brain which leads to plaque formation. Researchers have found that Beta amyloid leads to increase in oxidative stress inside the brain and also changes some functionality of BBB. Also oxidative stress outside the brain increases with increased oxidative stress inside brain and amount of **4-HydroxyNonenal (4-HNE)** is five times higher in AD patients.



Structure of 4-Hydroxynonanal

Bioreceptor for this sensor will be **Glutathione S-Transferase**. 4-HNE is highly reactive with Glutathione (tripeptide with Cysteine and Glutamic acid amino acids).

Here Glutathione S-Transferase is immobilized on self assembled monolayers of thiols on gold with $-\text{COOH}$ group at the surface.



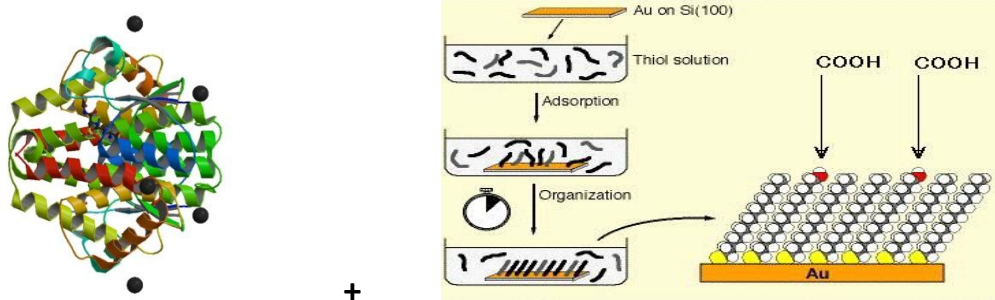
$-\text{COOH}$ on SAMs
of thiol on Au

Glutamine
amino acid

Glutathione S-Transferase
on SAMs of thiol on Au

Detection of the attachment of 4-HNE with Glutathione S-Transferase will be done **by SPR method** as it provides real time analysis with no labeling requirements .

Immobilization:

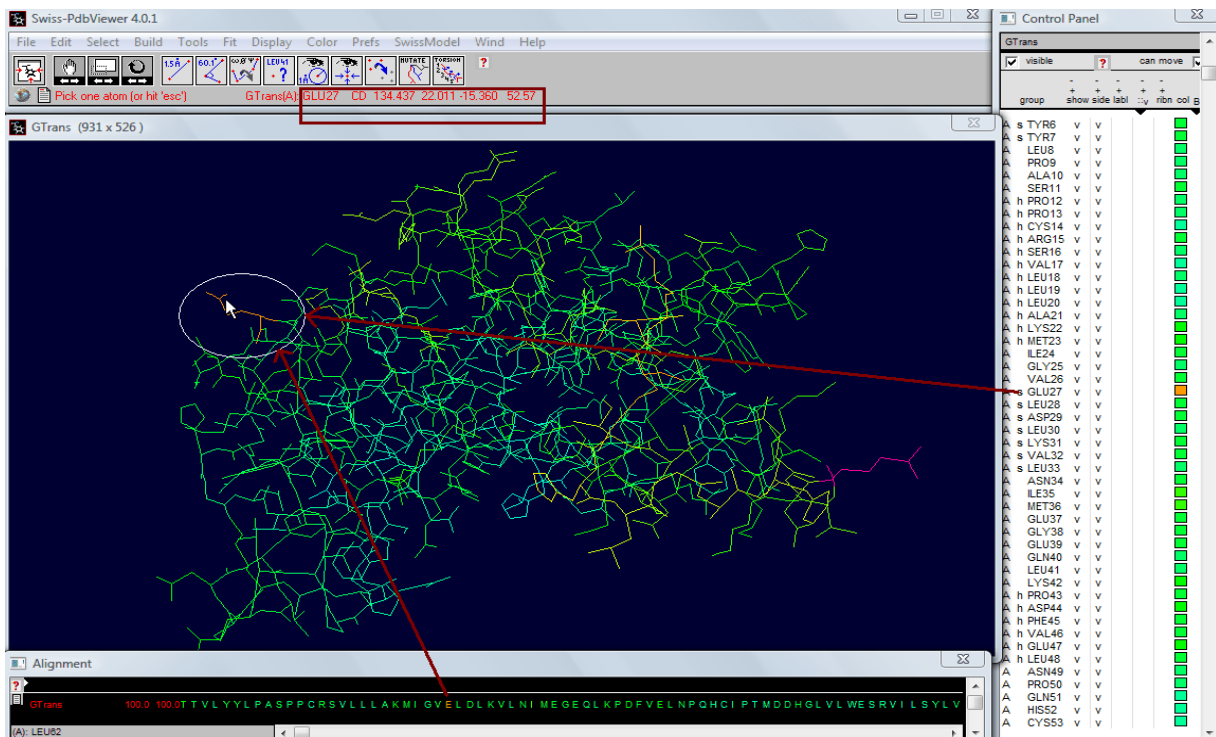


Glutathione S-Transferase

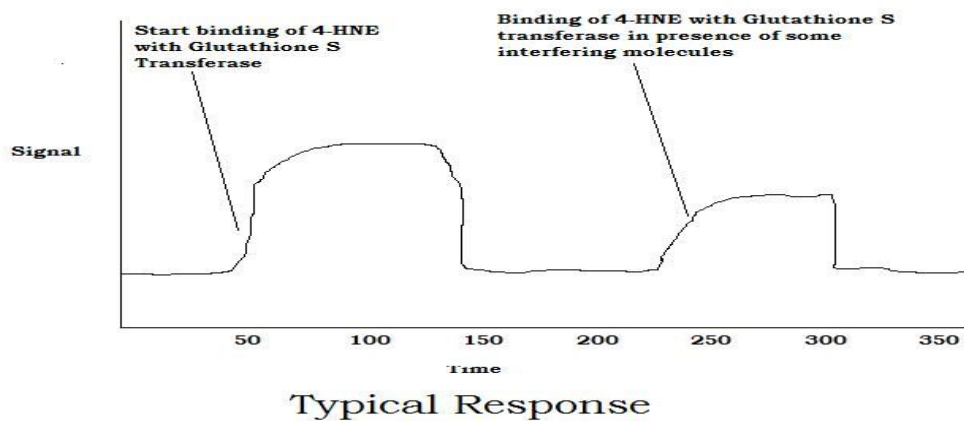
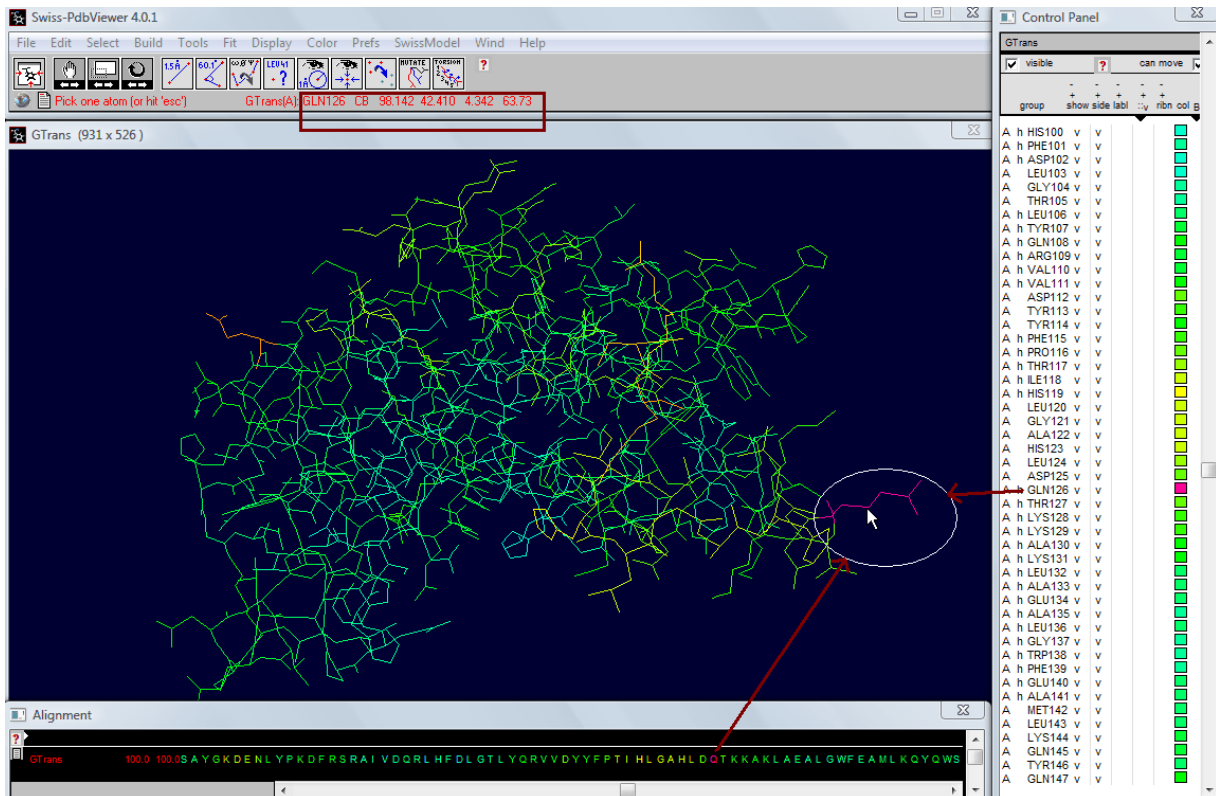
-NH₂ group of Glutamine amino acid and -COOH group on SAMs react and leads to immobilization of Glutathione S-Transferase on SAMs of thiol on gold surface.

In the structure of Glutathione S-Transferase, opposite to the Glutamine amino acid occurs Glutamic acid/ Glutamate (active binding site) which is highly reactive with 4-HNE. Binding is detected by Surface Plasmon Resonance technology.

Alzheimer Disease has no cure but **by identifying the Disease we can treat for the symptoms, delay its onset and prevent it from developing.**



Glutamate in structure of Glutathione S-Transferase which is responsible for Detection of 4-HNE and opposite to it is Glutamine amino acid for immobilization



Interfering Molecules:

- Some of the Small interfering RNA
- Also some other protein molecules
- May be some structural analogues of 4-Hydroxy 2-Nonenal