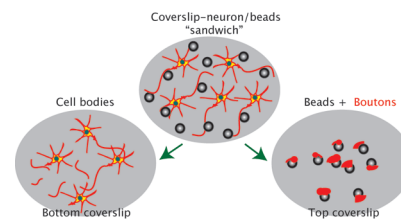


Smart Neuronal Regeneration

Recently, 3-d artificial substrates have been developed which can be used in studying the formation of functional synapses *in vitro*. Now, Lucido et al. (DOI: 10.1021/cn100048z) demonstrate that functional pre-synapses formed *in vitro* using substrates such as poly-L-lysine are functional in cell-free systems.

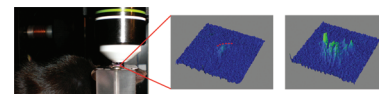
Specifically, presynaptic complexes are able to release and recycle neurotransmitters in response to specific chemical stimuli. Since the development of smart substrates for nanotechnology and neuroengineering is receiving considerable attention, the technologies presented here may come in handy in studying neuronal regeneration.



Calcium Waves Make a Splash

Glial cells utilize fluctuations in calcium concentration to transmit messages internally. Crowe et al. (DOI: 10.1021/cn100052v) have developed a new photosensitive organic molecule that can be used for probing calcium signaling in star-shaped glial cells known as astrocytes.

Brief light flashes from a laser were targeted deep into the brain of living mice, such that timing and location of calcium signals could be observed. The authors used this technique to observe the effects of Alzheimer's disease on calcium signaling in astrocytes and found calcium waves in a model of this disease.



Muscarinic Acetylcholine Receptor Agonists

Muscarinic acetylcholine receptors are members of the G-protein coupled receptor superfamily of cell-surface receptors which participate in the regulation of multiple central nervous system functions. These receptors are drug targets for disorders such as Alzheimer's disease and schizophrenia. Now, Davis et al. (DOI: 10.1021/cn100011e) compare

the cell signaling activities induced by two allosteric agonists of a muscarinic acetylcholine receptor to that of a classical muscarinic acetylcholine receptor agonist. The results presented by the authors may assist in the design of therapeutics for the treatment of many neurodegenerative and neuropsychiatric diseases.

