

Organic Bioelectronics – Nature Connected

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Abstract:

Organic electronic materials exhibit an array of desired characteristics making them excellent as the signal translator across the gap between biology and technology. These biocompatible materials, often complexed with polyelectrolytes and other functional materials, can be included in device structures, which are flexible, stretchable and even gelled, and can also process electronic, ionic and charged biomolecules in combination. This makes the organic electronic materials unique in several respects to record and regulate functions and physiology of biological systems.

Here, a short review of some of the recent progresses from the Laboratory of Organic Electronics is given. In the BioComLab effort, a body area network is used to “connect” electronic skin patches with drug delivery components. This system provides a feedback system, also connected to the cloud for future healthcare. Sensors, converting biochemical signals into electric ones, are typically built up from organic electrochemical transistors and selectivity is typically provided from receptor mediation and oxidase approaches. Conversely, the organic electronic ion pump, converts an electronic addressing signal into the delivery of specific biomolecules, such as a neurotransmitter, to actuate and control functions of for instance the neuronal system. With the BioComLab technology the wide array of neuronal disorders and diseases are targeted, such as epilepsy, Parkinson’s disease and chronic pain.

In the e-Plant effort, the BioComLab technology is applied to the plant kingdom to record and impact the signaling pathways of phytohormones, thus allowing us to regulate the growth and expression of specific components of flowers and trees. Further, organic electronic materials can also be applied from aqueous solution directly into the biological system, thus enabling a unique approach to manufacture devices and electrodes *in vivo*. We are currently exploring this *in vivo*-manufacturing concept in several settings to define devices and circuits in various plants, to generate a seamless interface between Organic Bioelectronics and biological systems, in general.

BioComLab



Electronic Plants

