



26 de Febrero de 2026

12.00 h, Sala Central CIRCE
Campus Río Ebro

New models for fabrication and actuation of living electronic interfaces

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The unmatched capability of living cells to fabricate complex structure starting from simple building blocks offers new paradigms to seamlessly integrate new electronic structures into the living matter, creating new hybrid devices. We exploited this potential in a simple tissue-like organism, the freshwater polyp *Hydra vulgaris*, and here we provide an overview of recent and on-going results obtained with this model together with our methodological approaches ranging from behavioural to optical, spectroscopical, and electrical characterization. By simple exposure to conjugated oligomers we show the capability of *Hydra* to fabricate new electronically conducting microstructures in specific cell types, thanks to endogenous enzymatic activity. In another case, fluorescent and conductive microfibers embedded into the tissues were self produced starting from oligothiophene compounds, showing the feasibility to use these organisms as biofactories to fabricate and to test novel bioelectronic interface. The mechanism of fiber biogenesis was further dissected in cell systems, where advanced characterization techniques suggested the active involvement of cell driven processes in the fiber assembling. Cells and tissues with integrated biocompatible electronics, manufactured in vivo in localized regions, may inspire new devices to manipulate biological functions by adding or augmenting conductivity in physiological or pathological contexts with spatiotemporal control, paving the way to new bioengineering concepts.

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04/2024 - 03/2030

Ayuda CEX2023-001286-S financiada por



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