Stanford MEDICINE | Department of Biomedical Data Science

BIODS 260B

Computationally Design of Wearable Chemical Sensors for Personalized Healthcare

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Abstract:

Wearable chemical sensors have the potential to revolutionize precision medicine as they can non-invasively collect molecular information closely associated with an individual's health status. However, the majority of clinically relevant biomarkers cannot be continuously detected in situ using existing wearable approaches. Molecularly imprinted polymers (MIPs) are a promising candidate to address this challenge but haven't yet gained widespread use due to their complex design and optimization process yielding variable selectivity. Here, QuantumDock is introduced, an automated computational framework for universal MIP development toward wearable applications. Using an essential amino acid phenylalanine as the exemplar, we make a QuantumDock-optimized graphene-based wearable device is designed that can perform autonomous sweat induction, sampling, and sensing. We further introduce the future of wearable devices in the age of artificial intelligence.

Readings:

(1)

https://acrobat.adobe.com/link/review?uri=urn:aaid:scds:US:a4582850-eaff-3ccf-a5e1-822abddcc4bc

(2)

https://acrobat.adobe.com/link/review?uri=urn:aaid:scds:US:ca437853-9006-3a6e-8c96-31526dac45fd