지역혁신 선도연구센터(RLRC)
4차년도 정기세미나

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❍ 연사 : 부경대 스마트헬스케어학부 박승현 교수
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❍ Abstract :

Microneedles (MNs) are characterized by their high efficiency, localized action, and painless drug delivery and biosensing capabilities. Initially focusing on MNs for drug delivery, this field has expanded into the biosensors for healthcare monitoring. Various types of biosensors, including colorimetric sensors, antibody-antigen sensors, aptamer sensors, and electrochemical sensors, are available. Among them, it is possible to detect the biomolecules in human body by using the electrochemical sensor more rapid and precise. In this presentation, the representative research topics related to electrochemical MN biosensors for neurotransmitters detection were introduced. Through convergence with electrochemical sensor and microneedle, we were able to detect the biomolecules in the interstitial fluid in electrochemically. A MN biosensor for the measurement of dopamine concentration in vitro, up to 250 nM, was developed using the swelling behavior of methacrylated hyaluronic acid MNs. Building upon this, we combined interdigitated electrodes with swellable MNs to create a biosensor capable of highly sensitive single-step measurement of levodopa concentrations in the interstitial fluid. This biosensor proved its ability to measure levodopa down to 100 nM in vitro, showing its high sensitivity and simplicity compared to other technologies. The development of these MNs for electrochemical biosensing opens up possibilities for advancing personalized, patient-friendly, and digital healthcare applications.

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