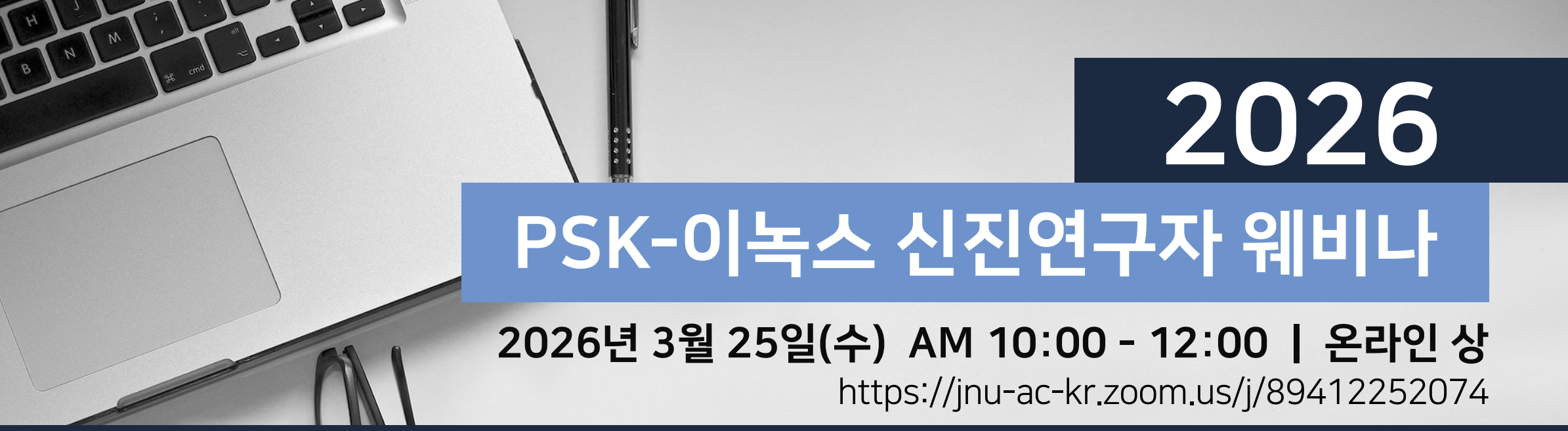

2026 PSK-이녹스 신진연구자 웨비나

2026년 3월 25일(수) AM 10:00 - 12:00 | 온라인 상

https://jnu-ac-kr.zoom.us/j/89412252074

주최 한국고분자학회 주관 의료용 고분자 부문위원회 후원 INNOX

○ 초대의 글

'PSK-이녹스 신진연구자 웨비나'는 우수한 연구역량을 가진 신진연구자를 발굴하여 교류의 장을 넓히고자 (주)이녹스의 후원과 한국고분자학회 주최로 마련한 온라인 세미나입니다. 이번 세미나에서는 첨단 임상 적용을 위한 생체의료 소재 공학 분야에서 선도연구를 수행하는 신진연구자의 우수한 연구성과를 공유하는 자리를 마련하였으니 관심있는 분들의 많은 참여 부탁드립니다.

○ 일정

AM 10:00 - 11:00	High-Fidelity Tissue and Organ Phantoms via Inverse Design of Single-Network Gels with Tunable Viscoelasticity for Precision Surgical Simulation Junggeon Park (박중건), junggeon@illinois.edu University of Illinois at Urbana-Champaign (UIUC)
	ABSTRACT: Surgical training phantoms play a critical role in high-fidelity clinical education, human–machine interaction, and robotic-assisted procedures. However, conventional silicone- and hydrogel-based phantoms often suffer from overly elastic behavior, mechanical fragility, and rapid dehydration, resulting in unrealistic tactile feedback during surgical manipulation. Here, we present a single network-based PHANTOM gel (3D PHotolitographic, Anti-drying, Tough, and Mechano-tunable) that addresses these challenges through a machine-learning-guided inverse material design approach. By systematically quantifying the combined effects of acrylamide concentration and crosslinking density, we constructed a nonlinear regression model that enables inverse identification of gel formulations matching organ-specific viscoelastic properties, including those of cardiac muscle and liver tissue. The resulting PHANTOM gels exhibit tissue-mimetic haptic responses and enhanced visual realism under surgical handling. Moreover, high-resolution stereolithographic printing allows fabrication of anatomically accurate organ phantoms representing both healthy and pathological conditions while maintaining target mechanical characteristics. Together, this platform offers a versatile and scalable strategy for designing realistic, patient-specific materials for advanced surgical training and simulation.
AM 11:00 - 12:00	Molecular Control for Predictable Immunosuppression: A Long-Acting Injectable Depot for VCA Sohyung Lee (이소형), slee207@bwh.harvard.edu Brigham and Women's Hospital, Harvard Medical School
	ABSTRACT: Vascularized composite allotransplantation (VCA), such as limb and face transplantation, can restore complex tissue function but remains fundamentally limited by lifelong systemic immunosuppression. Tacrolimus is central to preventing rejection, yet clinical control is difficult: it requires strict adherence, has a narrow therapeutic window, and shows large inter- and intra-patient variability due to absorption and metabolism. Long-acting injectables offer an alternative to daily dosing, but most phase-inversion depots suffer from burst release and are not designed for co-formulated regimens commonly used in transplant care. In this talk, I will describe a strategy to achieve molecular-level control over depot formation and drug retention to stabilize tacrolimus pharmacokinetics. By pairing rational excipient selection with control of solvent exchange and microstructure evolution during phase inversion, we suppress early drug loss and reduce concentration fluctuations. Leveraging non-covalent interactions informed by in silico screening, we identify additives—including rapamycin itself—that both modulate solvent efflux and enhance tacrolimus retention, enabling combination delivery from a single formulation. I will present in vitro and in vivo results demonstrating reduced burst release, sustained systemic levels within target range, and the added safety feature of depot retrievability. Finally, I will highlight efficacy in stringent transplant models, including long-term limb allograft survival in rats and translation to a porcine VCA setting with therapeutic-range systemic levels and prolonged graft survival. Together, these results outline a general framework for engineering long-acting depots that convert potent drugs into clinically stable immunosuppression.

한국고분자학회
The Polymer Society of Korea