講演会のご案内

ナレスワン大学（タイ王国）より 2 名の講師をお迎えして、下記の通り講演会を開催いたします。ぜひ、ご聴講ください。

- 日　時：9 月 18 日（水）14:00～16:00
- 場　所：総合研究棟 5F　503 室
- 主　催：アクア・リジェネレーション機構　特別栄誉教授　遠藤守信

【講演内容】

- **講演 1**

講師：ナレスワン大学　理学部准教授／副学部長（国際交流担当）／
Center of Excellence for Biomaterials センター長　**Sukunya Ross** 氏
演題：**Poly (lactic acid) and Silk Sericin: Exploring Their Potential in Tissue Engineering Scaffolds**

- **講演 2**

講師：ナレスワン大学　理学部准教授　**Gareth Michael Ross** 氏
演題：**Synergy of Beauty Care & Wound Management through Innovative Hydrogels**

【講演要旨】

- **講演 1**

Poly (lactic acid) and Silk Sericin: Exploring Their Potential in Tissue Engineering Scaffolds

Sukunya Ross

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Scaffold-based tissue engineering in the medical field aims not only to repair but also to regenerate target tissue. Polymeric biomaterials and natural products are commonly used for fabricating tissue engineering scaffolds due to their biodegradable and biocompatible properties. Our research group has focused on two particular biomaterials: Poly (lactic acid) (PLA), a synthetic and FDA-approved material, and silk sericin (SS), a natural product derived from silk cocoons. We have designed and fabricated scaffolds using either PLA or SS in various forms, including electrospun nanofibers, porous hydrogels, films, micro- and nanogels, and porous materials, specifically for skin and alveolar bone tissue

engineering. To optimize scaffold design, we have employed a new technique called the ‘rapid screening method’ in conjunction with classical methods such as free-radical polymerization, lyophilization, and electrospinning. We thoroughly studied and evaluated the scaffolds' characteristics, including miscibility, diameter sizes, porous structure, intermolecular bonding, crosslinking networks, crystallinity, hydrophilicity, in vitro degradation, and in vitro cell cultures, to refine and enhance their suitability for tissue engineering applications.

Keywords: Scaffold, Tissue Engineering, Poly (lactic acid), Silk Sericin, Biodegradability

- **講演 2**

Synergy of Beauty Care & Wound Management through Innovative Hydrogels

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Hydrogels, a unique type of biomaterial, have gained significant research interest since their introduction. Widely used in contact lenses and wound healing at both ocular and dermal sites, their main advantage lies in their water content, which governs many of their beneficial properties. Equilibrium water content (EWC) is a key measurement in hydrogel research, indicating the total water in fully hydrated gels. However, traditional hydrogel wound dressings are limited by their inability to handle medium to heavy exudating wounds. Innovative approaches, such as sulphonated monomer-based hydrogels, offer promising solutions with enhanced properties like pain relief, inflammation reduction, and accelerated healing. The water in hydrogels exists in multiple states, measurable by differential scanning calorimetry (DSC). The endothermic peak at 0°C measures the freezing water, while EWC provides the total non-freezing water. These are often termed ‘free’ and ‘bound’ water, with bound water associated with the polymer backbone. Recent studies show that the amounts of free and bound water influence hydrogel behavior in drug delivery. This talk highlights the importance of water structure in hydrogels using a novel series of hydrogels. Furthermore, the presentation introduces cutting-edge porous hydrogels and liquid bandages that demonstrate superior absorption and ease of application. It highlights ongoing research and development efforts aimed at overcoming current limitations and optimizing the therapeutic and cosmetic benefits of hydrogels.

Keywords: Hydrogels, wound dressings, cosmetic gels, sulphonated monomers, liquid bandages, polymer network, moisture control.