

## 24th Materials Science and Nano Tech Expo

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# Optimization of Nano-encapsulation on Neonatal Porcine Islet-like Cell Clusters Using Polymersomes

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Kim has his expertise in evaluation and passion in improving the health and wellbeing. His open and contextual evaluation model based on responsive constructivists creates new pathways for improving healthcare. He has built this model after years of experience in research, evaluation, teaching and administration both in hospital and education institutions. Kim pursued in the Department of Biotechnology and Bioengineering, Kangwon National University, Gangwon-do, Republic of Korea (200 word limit).

***Abstract (600 Word Limit)***

Researches proving methods for nano-encapsulation of neonatal porcine islet-like cell clusters (NPCCs) using polymersomes (PSomes) formed using polymers of polyethylene glycol-block-poly lactide. Herein, our studies present efficient nano-encapsulation procedure with minimal damage and loss of NPCCs. We used N-hydroxysuccinimide (NHS) on the N-terminal of PSomes to induce binding of amine groups in the extracellular matrix surrounding NPCCs. F-10 culture medium with bovine serum albumin was used in the nano-encapsulation procedure to minimize damage and loss of NPCCs. Finally, we induced cross-linking between bifunctional PSomes (NHS-/NH<sub>2</sub>-PSomes). F-10 culture medium containing 0.25% BSA with pH of 7.3 minimized the damage and loss of NPCCs after nano-encapsulation as compared with using basic HBSS buffer (pH 8.0). Also, we induced the efficient nano-encapsulation through conjugation of PSomes using bifunctional PSomes (NHS-/NH<sub>2</sub>-PSomes).

***Importance of Research (200 Word Limit)***

The use of allo-islet transplantation in the treatment of type 1 diabetes is limited owing to lack of suitable donors. Instead, there is a gradual increase in the use of animal islets in xeno-islet transplantation, with pigs emerging as optimal donor species. When pigs are used as donors during transplantation, separate islets can be used, based on the age of the pigs. Often, neonatal porcine islet-like cell clusters (NPCCs) are preferred over adult porcine islets (APIs) owing to their affordability and ease of isolation. In addition, NPCCs can proliferate gradually after transplantation, prolonging their function in vivo. However, when NPCCs are transplanted into human or non-human primate (NHP) portal veins, interspecies variations can cause immune reactions such as instant blood-mediated inflammatory reaction (IBMIR) or hyperacute rejection, leading to early graft loss (200 word Limit).

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**About University (200 Word Limit)**

Kangwon National University (KNU) is a national university in Gangwon-do, South Korea. Established as Kangwon Provincial Chuncheon Agricultural College in 1947 in Chuncheon, it extended to a comprehensive university in 1978. KNU serves as the flagship educational institution representing Gangwon-do. (200 word limit)

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