

**Efficient hPTH delivery by poly vinyl pyrrolidone containing dissolvable microneedle patches**

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We studied the role of the additives trehalose and Poly Vinyl Pyrrolidone (PVP) in the physical and pharmacokinetic properties of peptide incorporated Hyaluronic Acid (HA)MNs. PVP increases the mechanical strength of MNs and ameliorates drug bioavailability, suggesting that PVP can be a promising additive in the fabrication of peptide drug-encapsulated fully dissolving MNs. We produced HA-based dissolving MNs using a novel Droplet-orn Air Blowing (DAB) method. In contrast to conventional methods with harsh process conditions, such as heat or UV irradiation, the DAB method fabricates MNs in a fast and gentle manner with a marginal loss of the activity of biological drugs. In order to enhance the drug release kinetics from dissolving HA MNs, trehalose and PVP were supplemented to the HA MNs. All MN patches with three formulations have enough mechanical strength to penetrate the skin without distortions. It is worth noting that the MNs containing PVP showed the highest fracture force among all formulations due to the hardening effect of PVP. To evaluate drug delivery efficiencies depending on the MN compositions, HA, HA/trehalose and HA/PVP MN patches were applied to the dorsal surface of rats. At various time points after administration, blood samples were collected to analyse the serum concentration of hPTH. Both trehalose and PVP improved the drug bioavailability compared to additive-free HA MNs, while PVP increased the drug delivery efficiency much more significantly than trehalose. We are planning to apply this result to develop high dose, fast delivery MN patch using drug loaded adhesive patch.

**Biography**

Jung Dong Kim has completed his Bachelor's and PhD degree in Biotechnology from Yonsei University, South Korea. He has joined to Raphas at 2010 for the industrialization of microneedle using Droplet-born Air Blowing technology. He was a Cooperative Researcher of Institute of Industrial Science, The University of Tokyo, since 2014 to 2017. He received IR52 Jang Young Sil Award twice from the Minister of Science, ICT and Future at 2016 and Minister of Science and ICT at 2017.