permeation during the initial 2 hours period. MN application increased permeability at a time of 0.5 hours for up to approximately 17-fold with an average up to 4-fold. The time required to reach therapeutic levels of lidocaine was decreased to less than 7 minutes. Overall, the attempted approach promises to be a viable alternative to conventional lidocaine delivery methods involving painful injections by hypodermic needles. The mass transfer effects were fairly enhanced and the lowest amount of lidocaine in skin was 99.7% of the delivered amount at a time of 3 hours for lidocaine NaCMC/GEL 1:2.66 after low-frequency sonophoresis and MN treatment.

Rai, V. et al. (2011). "Effect of surfactants and pH on naltrexone (NTX) permeation across buccal mucosa." *Int J Pharm* 411(1–2):92–97.

The objective of this preformulation study was to systematically investigate the effects of two surfactants (Brij 58® and Tween 80®) and change in solution pH on in vitro permeation of naltrexone HCl (NTX-HCl) across tissue engineered human buccal mucosa. For the study, 10 mg/mL solutions of Tween 80® (0.1 and 1%, w/v) and Brij 58® (1%, w/v) were prepared in standard artificial saliva buffer solution (pH 6.8). For studying pH effects, solution pH was adjusted to either 7.5 or 8.2. As controls, three concentrations of NTX-HCl (2.5, 10, and 25 mg/mL) were prepared. Using NTX standard solution (10 mg/mL; pH 6.8), the permeation was observed between in vitro human and ex vivo porcine mucosa. It was observed that Brij 58® increased the permeation rates of NTX significantly. The flux of 10 mg/mL solution (pH 6.8) increased from 1.9 ± 0.6 (× 10(2)) to 13.9 ± 2.2 (× 10(2)) μg/(cm^{2}h) (approximately 6-fold) in presence of 1% Brij 58®. Increasing pH of NTX-HCl solution was found to increase the drug flux from 1.9 ± 0.6 (× 10(2)) (pH 6.8) to 3.0 ± 0.6 (× 10(2)) (pH 7.4) and 8.0 ± 3.5 (× 10(2)) (pH 8.2) μg/(cm^{2}h), respectively. Histological analyses exhibited no tissue damage due to exposure of buccal tissue to Brij 58®. The mean permeability coefficients (K(p)) for 2.5, 10 and 25 mg/mL solutions of NTX-HCl (pH 6.8) were 5.0 (× 10(−2)), 1.8 (× 10(−2)) and 3.2 (× 10(−2)) cm/h, respectively, consistent with data from published literature sources. Increase of NTX flux observed with 1% Brij 58® solution may be due to the effects of ATP. Increase in flux and the shortening of lag time observed by increasing in solution pH confirmed earlier finding that distribution coefficient (logD) of NTX is significantly affected by small increments in pH value and therefore plays an important role in NTX permeation by allowing faster diffusion across tissue engineered human buccal tissue.

Rajesh, S. Y. et al. (2018). "Impact of various solid carriers and spray drying on pre/post compression properties of solid SNEDDS loaded with glimepiride: In vitro–ex vivo evaluation and cytotoxicity assessment." *Drug Dev Ind Pharm* 44(7):1056–1069.

Development of self-nanoemulsifying drug delivery systems (SNEDDS) of glimepiride is reported with the aim to achieve its oral delivery. Lauroglycol FCC, Tween-80, and ethanol were used as oil, surfactant, and cosurfactant, respectively, as independent variables. The optimized composition of SNEDDS formulation (F1) was 10% v/v Lauroglycol FCC, 45% v/v Tween 80, 45% v/v ethanol, and 0.005% w/v glimepiride. Further, the optimized liquid SNEDDS were solidified through spray drying using various hydrophilic and hydrophobic carriers. Among the various carriers, Aerosil 200 was found to provide desirable flow, compression, dissolution, and diffusion. Both, liquid and solid-SNEDDS have shown release of more than 90% within 10 minutes. Results of permeation studies performed on Caco-2 cell showed that optimized