Mucoadhesive electrospun patch delivery of lidocaine to the oral mucosa and investigation of spatial distribution in tissue using MALDI mass spectrometry imaging

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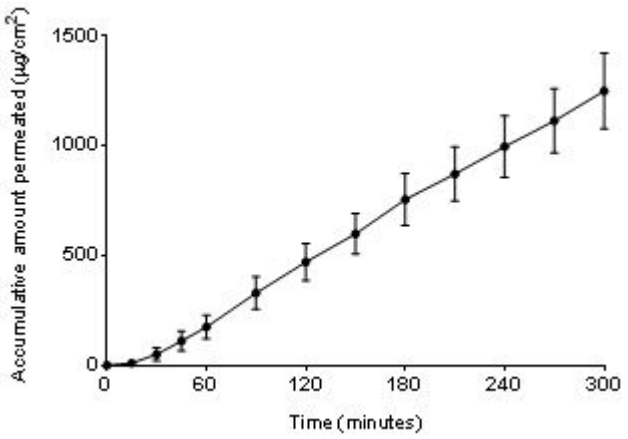
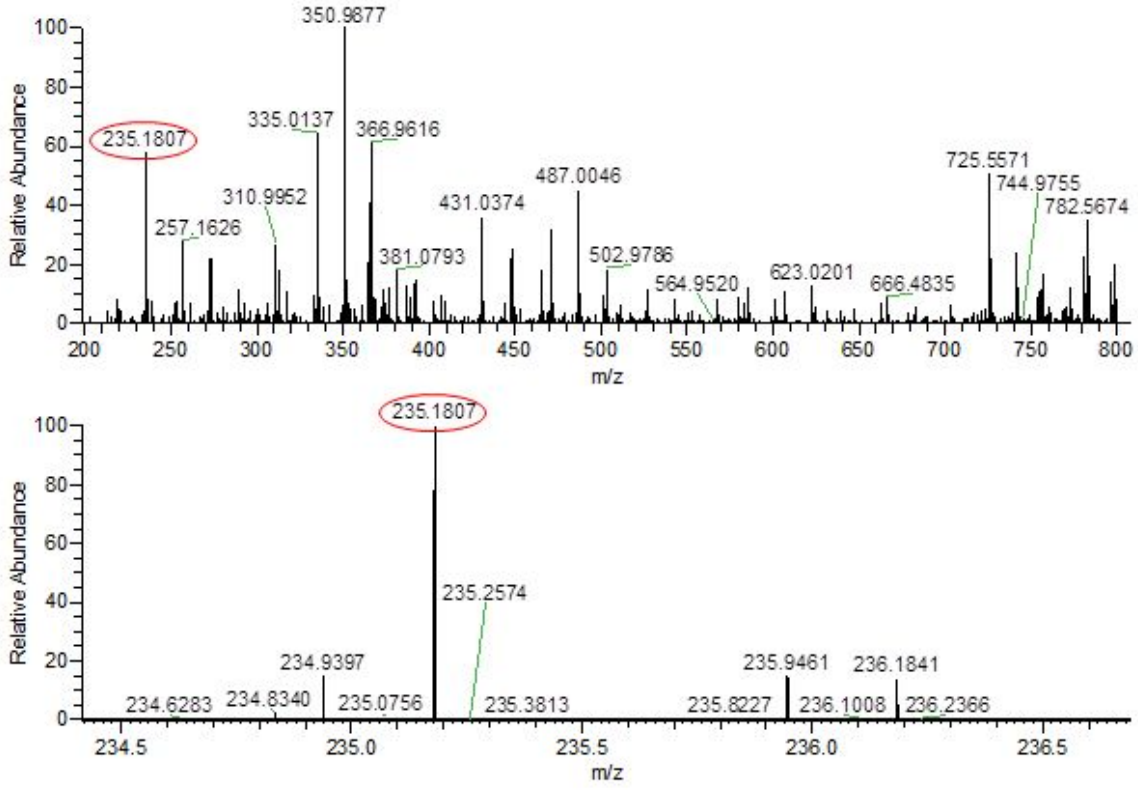
Supplementary information

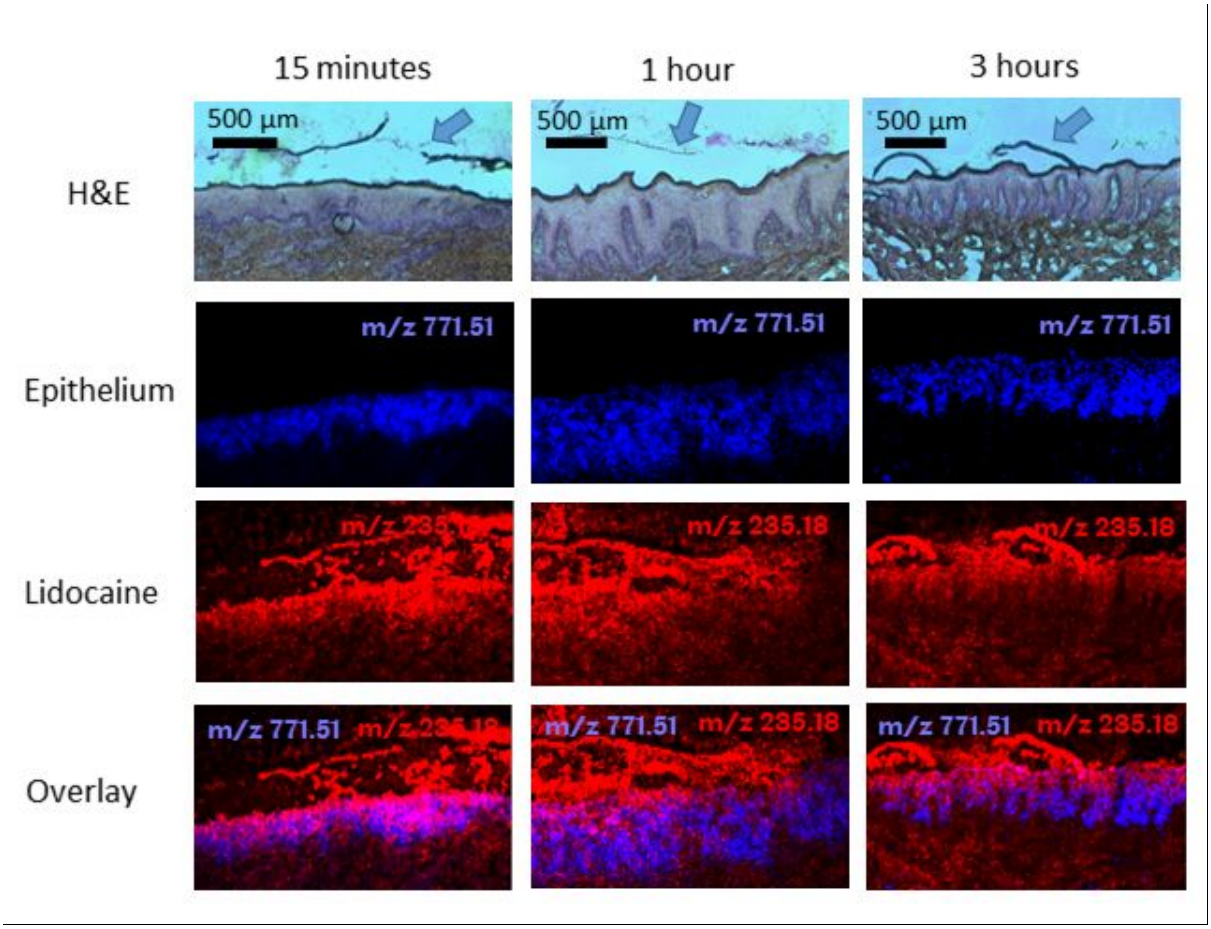


Supplementary Figure 1. Accumulative permeation of lidocaine applying 3% (w/v) lidocaine HCl in PBS through *ex vivo* porcine buccal mucosa. Data are mean ± SD (n=4).



Supplementary Figure 2. Mass spectrum from the image in Figure 6 (*t*=3h) averaged over 100 pixels in the tissue. As observed, lidocaine (m/z 235.1807) – a major peaks in the mass spectrum – was detected very close to its theoretical mass of 235.1805, corresponding to a mass accuracy of 1.0 ppm. The bottom spectrum is the same data, zoomed to a smaller mass range, showing the width of the

lidocaine peak. The extremely narrow peak width provides a very high selectivity and thus minimizes the risk of interferences with endogenous compounds and signals from the MALDI matrix.



Supplementary Figure 3. Hematoxylin and eosin (H&E) stained tissue sections and corresponding MALDI-MS images of porcine buccal mucosa exposed to dual-layer electrospun patches containing 3% (w/v) lidocaine base (*m/z* 235.1805 $[M+Na]^+$; red) after 15 min, 1 h and 3 h. The epithelium (blue) for each sample is shown using the epithelial marker PG (34:1) (*m/z* 771.5140 $[M+Na]^+$). The arrows in the H&E images show the position of the electrospun patch.