**Supplementary Figures**



**Figure S1.** Illustration of the “Measurement Editor” feature using the IONTOF software. Cross sections are measured manually and are illustrated by the green line in **(B)**. **(A)** Illustration of the change in C7H4N2Cl- ion intensity across the entirety of the tape strip. **(B)** Quantitative depth permeation measurement of C7H4N2Cl- ion distribution within porcine skin.



**Figure S2. A.** Chemical structure of CHG. **B.** Structure and m/z of CHG fragment used to map drug depth permeation using ToF-SIMS, previously discovered by Holmes *et al*.1. **C.** Mass spectra indicating specificity of C7H4N2Cl-ion to CHG (green peak) which is only present on tape strips taken from skin treated with CHG formulation. **D.** Tape strip images indicating specificity of C7H4N2Cl- ion to CHG. Each image represents a 4 mm × 4 mm area.



**Figure S3.** Changes in peak shape before (grey line) and after (red line) dead-time correction. Changes to Cl- peak before and after deadtime correction highlights the presence of peak saturation. However, for the peak of interest C7H4N2Cl- (*m/z* 151); C5H11NPO4- (*m/z* 180) and C27H45SO4-, (*m/z* 465.3), there were minimal changes to the peak before and after deadtime correction, suggesting there were minimal to no peak saturation.



**Figure S4. A.** Suggestion of a sweat gland (PO3-) with lack of CHG permeation (indicated by white arrows). **B.** Suggestion of a hair follicle (C27H45SO4-) with lack of CHG permeation (indicated by white arrows).