

Title	Analysis of hydrofluoric acid penetration and decontamination of the eye by means of time-resolved optical coherence tomography
Authors	Felix Spöler ^{a, *} , Markus Frenz ^{b,c} , Michael Först ^a , Heinrich Kurz ^a , Norbert F. Schrage ^{b,c,d}
Publication	
Abstract	<p>So far the study of chemical burns has lacked techniques to define penetration kinetics and the effects of decontamination within biological structures. In this study, we aim to demonstrate that high-resolution optical coherence tomography (HR-OCT) can close this gap. Rabbit corneas were exposed ex vivo to 2.5% hydrofluoric acid (HF) solution, and microstructural changes were monitored in the time domain by OCT imaging. HF application and penetration resulted in shrinkage of the corneal thickness, interpreted as a result of osmolar changes and of loss of water-binding capacity, and a substantial increase in OCT signal amplitudes. The effectiveness of different rinsing solutions on the chemical burn was also evaluated. With tap water and with 1% calcium gluconate, the deep corneal stroma remained clear until the end of the rinsing period but became opaque afterwards. With Hexafluorine[®], the cornea remained clear for 60 min after rinsing ceased. We conclude that HR-OCT can assist in the clinical evaluation of an ex vivo eye irritation test, and that decontamination of an HF burn using Hexafluorine[®] is efficient.</p>
Laser Quantum Product	gigajet
Institute	<p>^a Institute of Semiconductor Electronics, RWTH Aachen University, Sommerfeldstraße 24, 52074 Aachen, Germany ^b Aachen Centre of Technology Transfer in Ophthalmology, Karlsburgweg 9, 52070 Aachen, Germany ^c Department of Ophthalmology, Aachen University, Pauwelsstraße 30, 52057 Aachen, Germany ^d Department of Ophthalmology Cologne Merheim, Ostmerheimer Str. 200, 51109 Cologne, Germany</p>