Surface functionalized nanofibrillar cellulose (NFC) film as a platform for immunoassays and diagnostics

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NFC-films were modified using sequential TEMPO-mediated oxidation and EDC/NHS activation. Antibodies were immobilized on the activated NFC-films by either inkjet printing or physical adsorption.
Macroscopic topography of NFC film

Confocal laser scanning microscopy (CLSM) image of unmodified NFC film (a). Digital photograph (4.5 x 2.5 cm²) of an unmodified NFC film (b).

Immobilization of antibodies on EDC/NHS-activated NFC films

CLSM intensity images of adsorbed FITC-stained antihuman IgG (0.1 mg/mL) in 10 mM phosphate buffer (pH 7.4) on unmodified NFC film (a) and EDC/NHS activated NFC-film (b).

- Films were rinsed with 10 mM NaCl (pH 10) to remove electrostatically bound antibodies.
Inkjet-printing of antibodies on EDC/NHS activated NFC films

Printed dansylated anti-human IgG (1 mg/mL in 10 mM phosphate buffer, pH 7.4) on EDC/NHS-activated NFC film under UV-light (366 nm) (a). CLSM intensity image of printed FITC-stained antihuman IgG (1 mg/mL in 10 mM phosphate buffer, pH 7.4) on activated NFC film (b). AFM height image on printed antihuman IgG on EDC/NHS-activated NFC film (c). The z-scale of the image is 50 nm.