Antibacterial properties of glycosylated surfaces: variation of the glucosidal moiety and fatty acid conformation of grafted microbial glycolipids
Supplementary information

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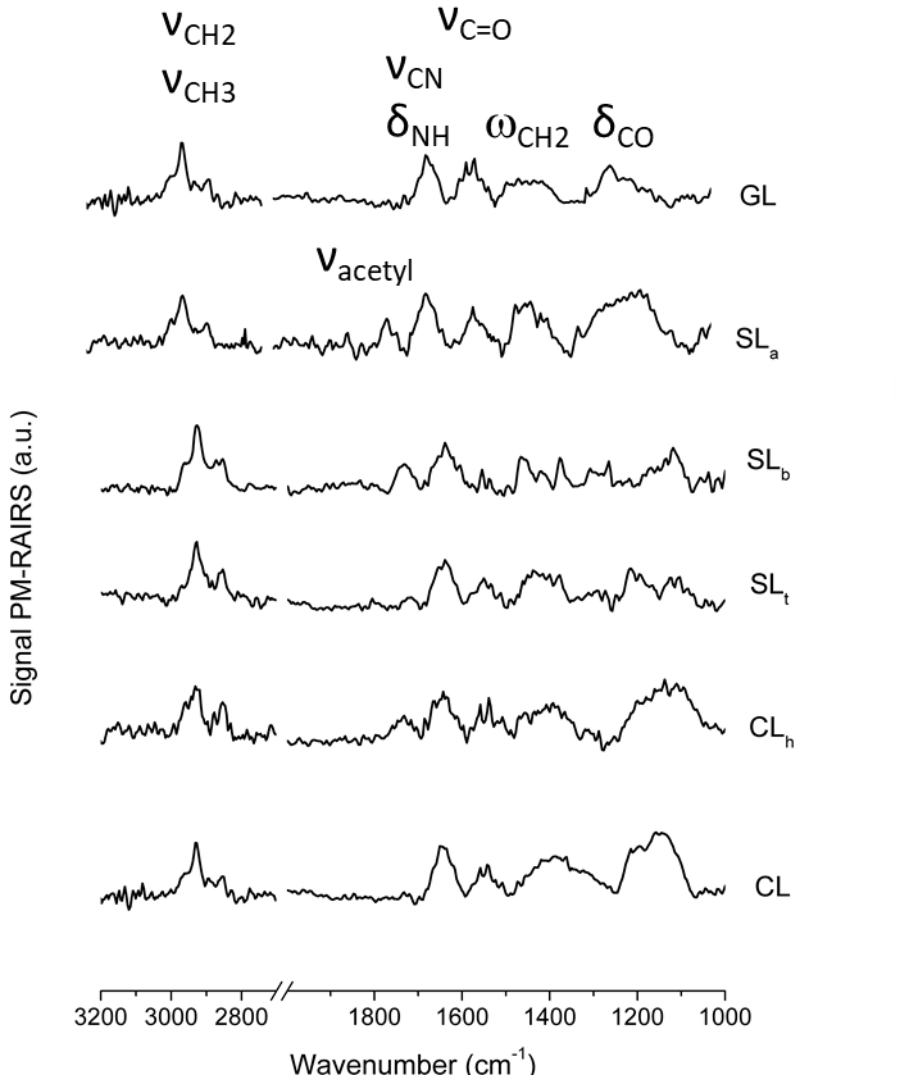

Figure S1. PM-RAIRS spectra of self-assembled monolayers of glucolipid (GL), acetylated *cis* sophorolipid (SL_a), branched sophorolipid (SL_b), *trans* sophorolipid (SL_t), cellobioselipid (CL) and hydrolyzed cellobioselipid (CL_h). The resonance signal at 1648 cm^{-1} ($\nu_{C=O}$ in amide) and 1562 cm^{-1} (ν_{CN} and δ_{NH}) are characteristic of amide bonds. The presence of aliphatic chains is attested by vibrational bands at 3000-2800 cm^{-1} (ν_S and ν_{AS} of CH_2 and ν_S of CH_3) and 1400 cm^{-1} (ω_{CH2}). The signal of carbohydrates resonates at 1200-1000 cm^{-1} (δ_{CO}), where a multitude of bands are partially overlapped and therefore difficult to interpret in detail. The elongation of the C=O bonds on acetyl moieties produces an additional band at 1740 cm^{-1} on spectra of samples prepared with acetylated SL_a and CL.

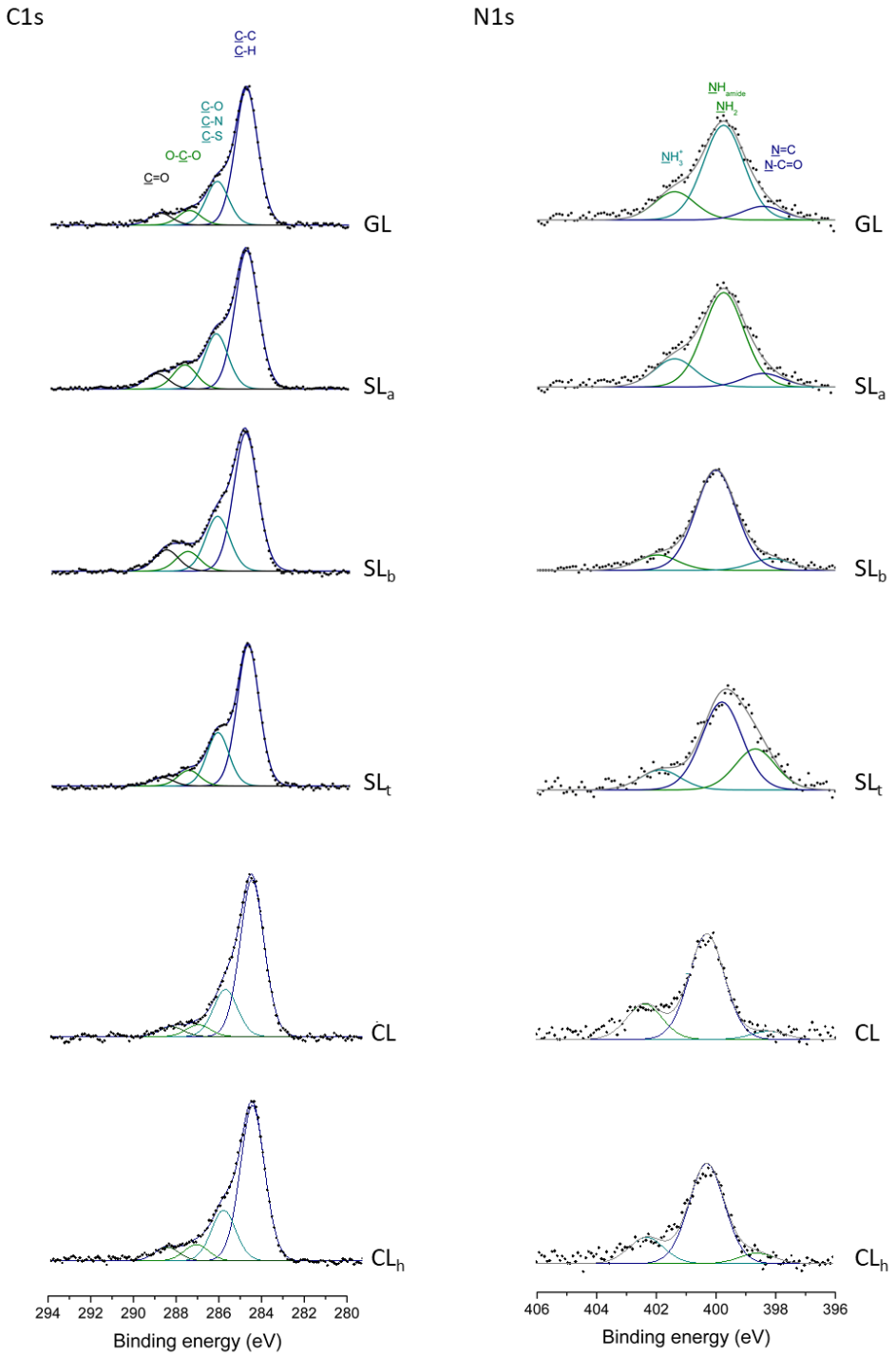

Figure S2. High resolution standardized XPS spectra of the C1s (left) and N1s (right) regions recorded on self-assembled monolayers of glucolipid (GL), acetylated *cis* sophorolipid (SL_a), branched sophorolipid (SL_b), *trans* sophorolipid (SL_t), cellobioselipid (CL) and hydrolyzed cellobioselipid (CL_h). The peak at 284.8 ± 0.1 eV in the C1s region attests the presence of an aliphatic chains while the two contributions, at 286.4 ± 0.1eV (C-OH) and 287.7 ± 0.1eV (O-C-O) are the signature of the carbohydrate groups, also visible in the O1s region. The shift of the nitrogen signal from 401.8 ± 0.1 eV (NH_3^+) on cys primer layer towards 399.9 ± 0.1 eV (NH_2 and NH in amide) after immersion on glycolipids solution demonstrate that the glycolipids are grafted via amide bonds.

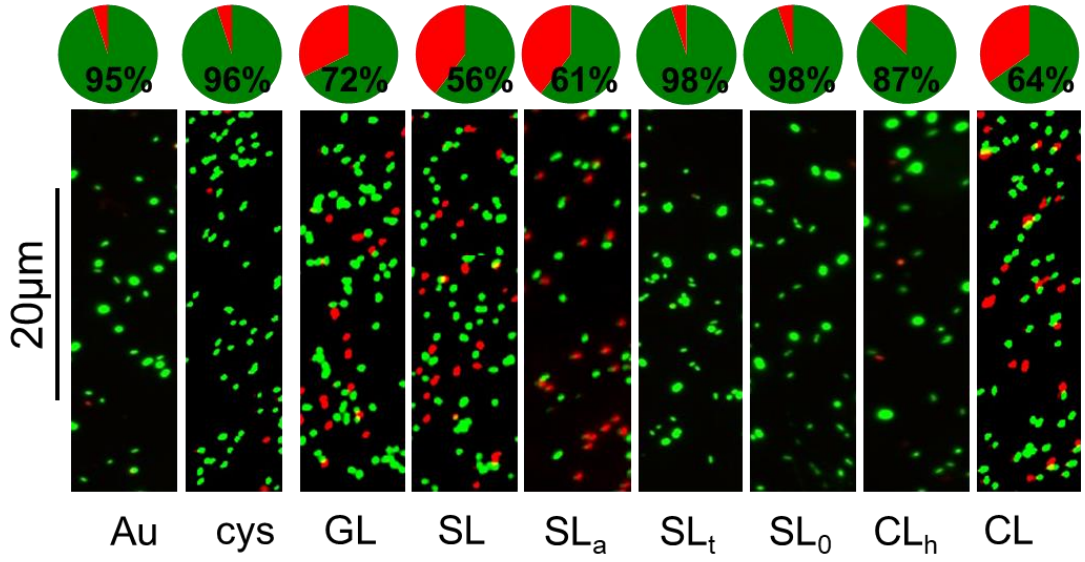

Figure S3. Fluorescent staining evidences membrane damages of bacteria (*L. ivanovii*) deposited on self-assembled monolayers of glucolipid (GL), deacetylated *cis* sophorolipid (SL), acetylated *cis* sophorolipid (SL_a), *trans* sophorolipid (SL_t), saturated sophorolipid (SL_0), hydrolyzed cellobioselipid (CL_h) and cellobioselipid (CL).

Biocompatible gold (Au) surfaces and cysteamine (cys) monolayers constitute negative (glycolipid-free) controls.

The chart above each image represents the proportion of adhering intact (percentage given) and damaged bacteria according to fluorescent staining.

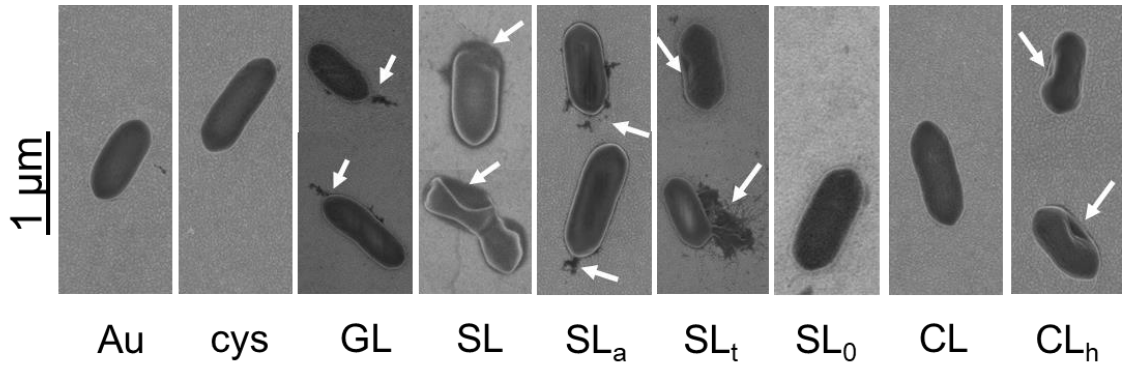

Figure S4. Scanning electron microscopy reveals qualitative morphological alterations (highlighted by white arrows) of bacteria (*L. ivanovii*) deposited on self-assembled monolayers of glucolipid (GL), deacetylated *cis* sophorolipid (SL), acetylated *cis* sophorolipid (SL_a), *trans* sophorolipid (SL_t), saturated sophorolipid (SL_0), cellobioselipid (CL) and hydrolyzed cellobioselipid (CL_h). Biocompatible gold (Au) surfaces and cysteamine (cys) monolayers constitute negative (glycolipid-free) controls.