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Haemophilus influenzae ability to form biofilms may be linked to virulence in non-typable isolates

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Background

Non-typeable *Haemophilus Influenzae* (NTHi) is responsible for invasive infections that are encountered frequently in older adults but also in all age groups. Biofilms represent a protective mechanism that enhances bacterial resistance to clearance. Biofilm formation by Hi has been studied in only a limited number of strains. A repertoire of genes and bacterial surface structures have been implicated in biofilm formation and its maturation. These include type IV pili over-expression, the presence of fimbriae, quorum sensing, the presence of outer membrane proteins P2, P5 and P6, and the presence of phosphorylcholine and sialic acid in the lipooligosaccharide molecule.

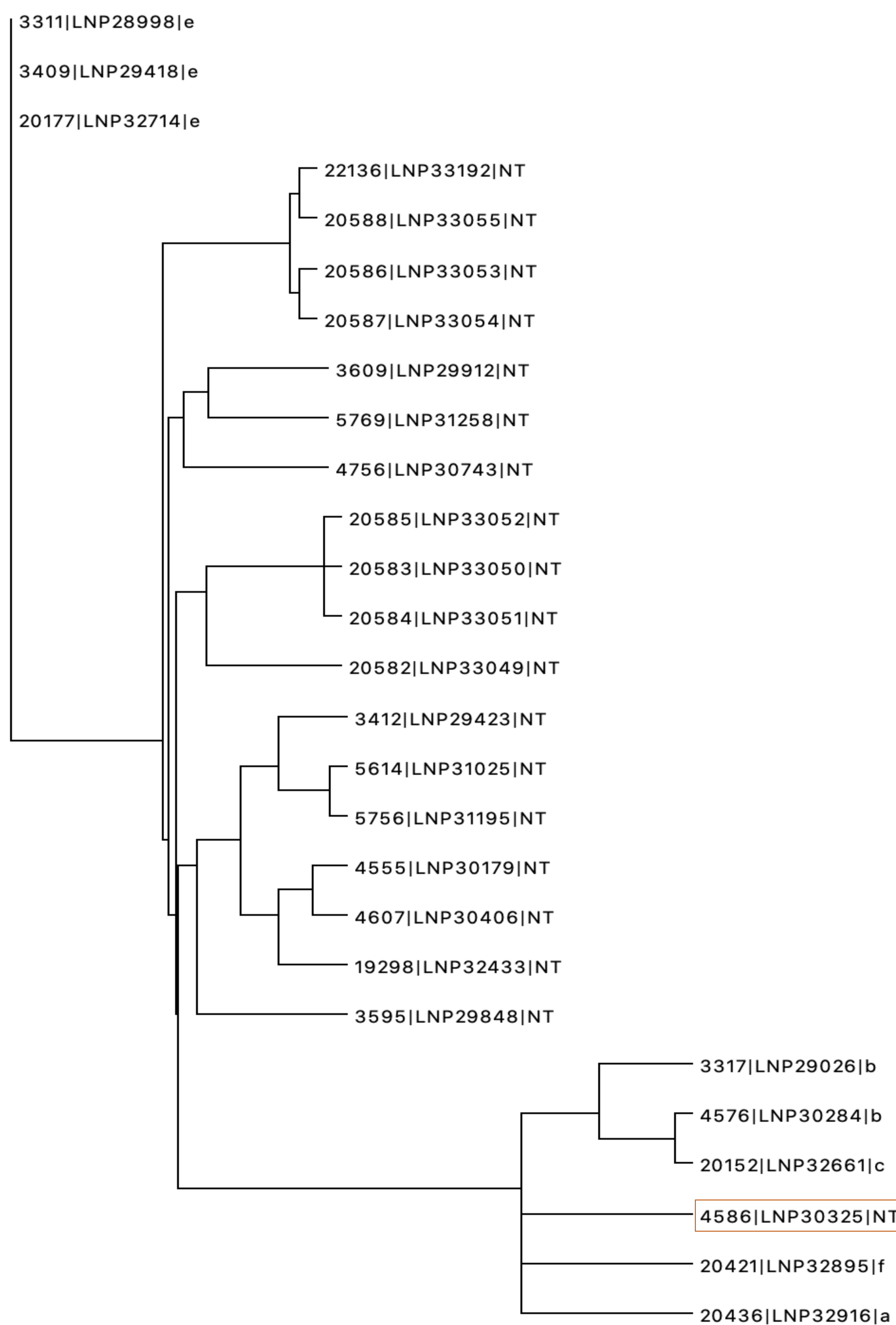
Objective

To explore biofilm formation by Hi and its link to virulence.

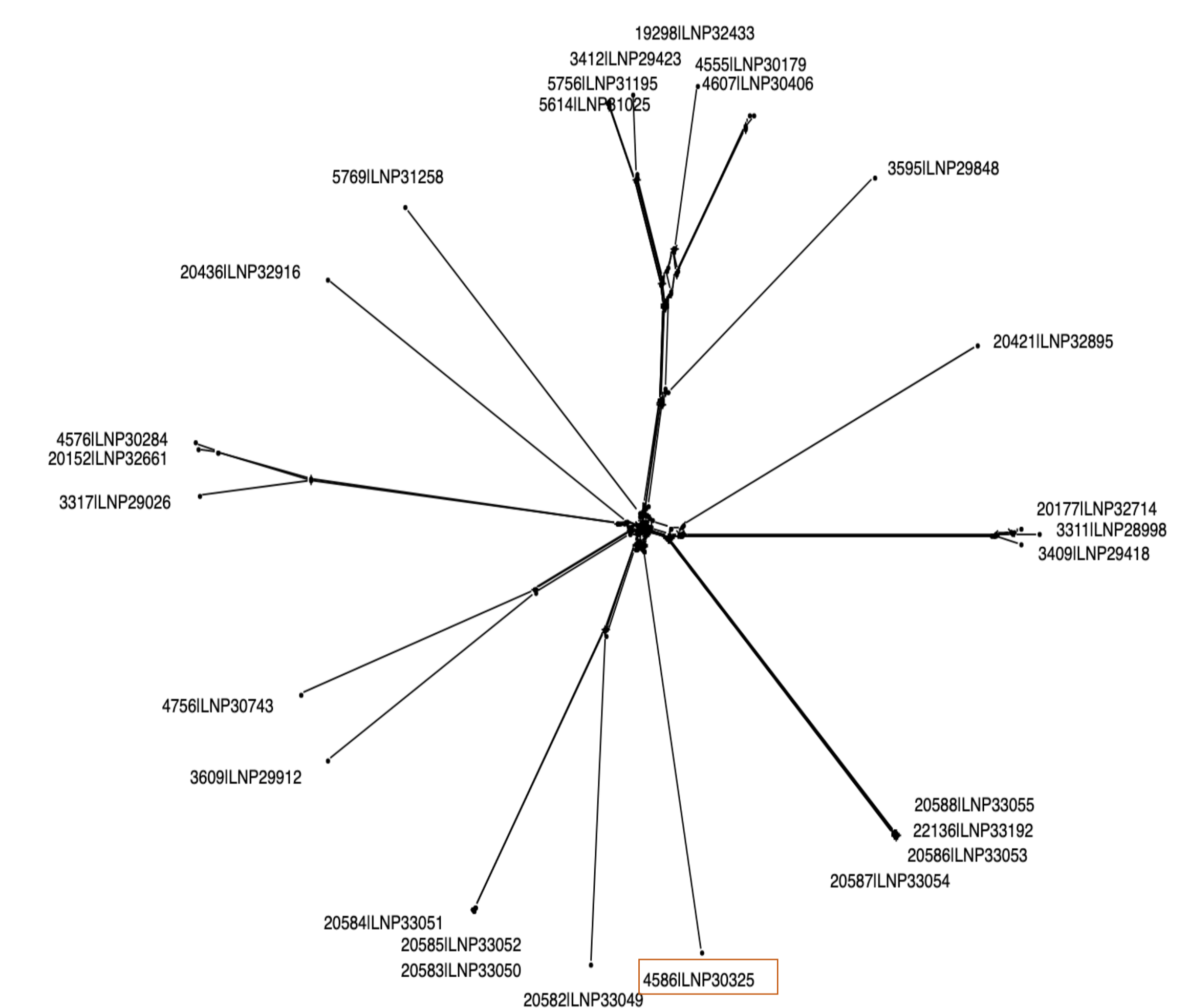
Methods

We selected a variety of Hi isolates (Invasive and non-invasive isolates; typeable and non-typeable isolates). WGS was used to characterize Hi according to schemes of genes involved in biofilm formation. We analyzed the ability of NTHi and typeable isolates to form biofilms using plate assay with crystal violet staining. We have investigated the deposition of C3b (a key component for complement-mediated clearance) on the surface of Hi isolates.

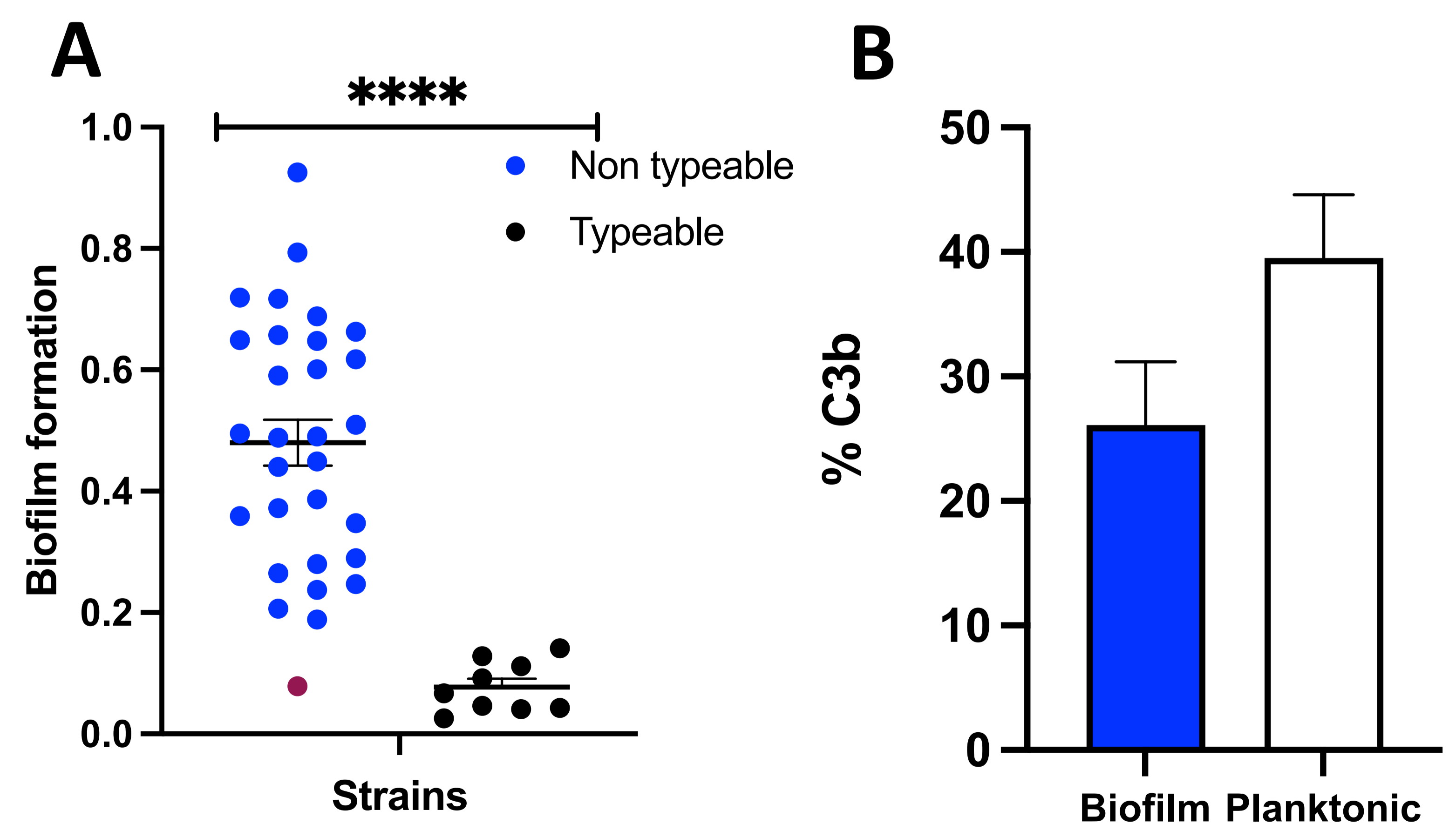
Results



Phylogenetic tree based on the alignment of repertoire of genes involved in biofilm formation



Phylogenetic tree based on the alignment of the whole genome sequences



(A) Biofilm formation (B) C3b deposition on the surface Hi strains grown as a planktonic culture or as a biofilm

Conclusion

NTHi isolates seem to produce more biofilm.
Biofilm may enhance NTHi survival in the host through reduction of complement clearance.