

Specific growth dynamics of Group B Streptococcus isolates in LIM broth

Camille Barro^{1,2}, Suzy Lim¹, Kay To^{1,3}, Kirsty Le Doare¹

1. Paediatric Infectious Diseases Research Group, Institute of Infection and Immunity, St George's, University of London, United Kingdom. 2. UnivLyon, Université Claude Bernard Lyon 1, France. 3. Department of Infectious Diseases, Imperial College London, United Kingdom.

Background

- LIM broth is the gold standard for isolation of Group B Streptococcus (GBS) in diagnosis settings. However, there is little information about the growth dynamics of different isolates in this selective enrichment media.
- A recent article (link via the QR code) showed that up to 5 different strains of GBS can be recovered from the same swab. It has to be taken into consideration regarding future serotype-based vaccines.



Methods



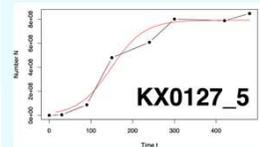
13 colonising isolates were retrieved from rectovaginal swabs from pregnant women and serotyped.



3 technical replicates were cultured individually in LIM broth for 24 hours (x3 biological replicates).



Optical density at 600nm (OD₆₀₀) and colony-forming units (CFU) were measured at defined time points.



Each growth curve of the nine replicates (black curve) was fitted into a non-linear least-squares Levenberg-Marquardt algorithm (red curve) on R.

The **carrying capacity** (= maximum population size in a given environment) and the **intrinsic growth rate** (= growth rate that would occur if no restriction was applied on the maximal size of the population) were retrieved and plotted in GraphPad (Fig 4).

Results

- SGX0119 (Ia)
- NPX0066 (Ia)
- KX0197 (Ib)
- KX0127 (Ib)
- NPX0074 (II)
- SGX0201 (II)
- KX0150 (II)
- SGX0228 (III)
- NPX0090 (III)
- KX0198 (IV)
- SGX0293 (IV)
- KX0140 (V)
- SGX0099 (VI)

Fig 1. ID and serotype of each isolate.

- One isolate showed exceptional growth, approximately 1.5 and 6 times higher than the mean of the other isolates, for density and viability, respectively.
- The density carrying capacity is significantly different for most isolates (50 out of the 78 paired comparisons) when compared with ANOVA ($p < 0.05$) (Fig 4).

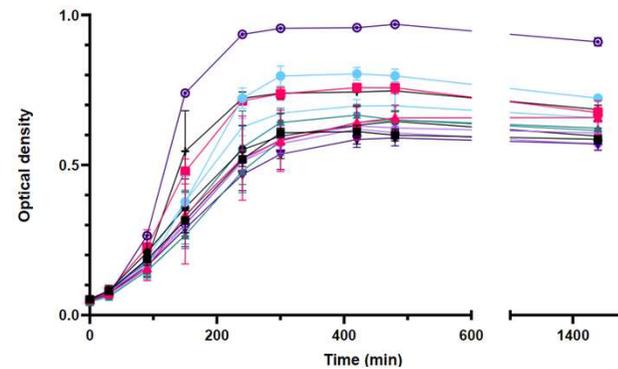


Fig 2. Bacterial density growth curves across time. Each curve is the average of nine replicates.

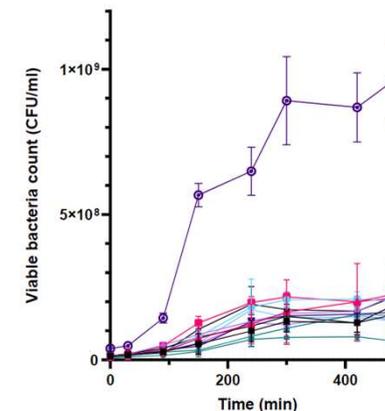


Fig 3. Bacterial viability growth curves across time. Each curve is the average of nine replicates.

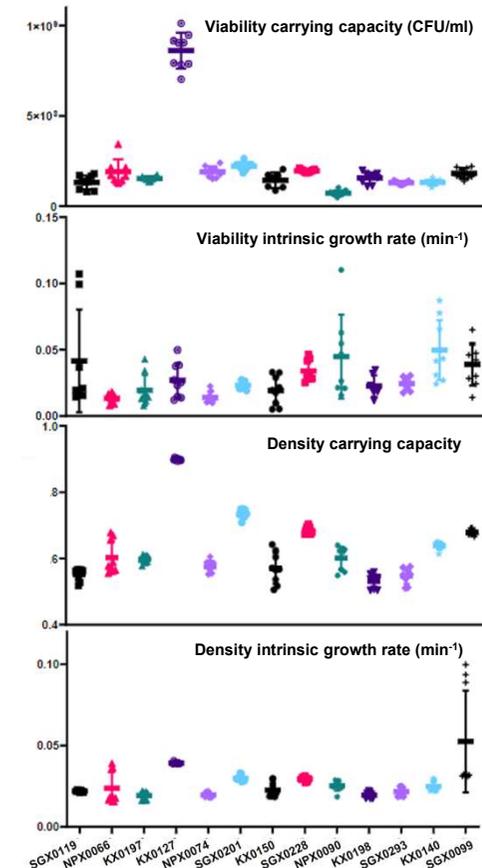


Fig 4. Growth characteristics of each isolate. Each dot represents a replicate.

Conclusions

- The investigated isolates reach specific population sizes when grown in LIM broth.
- This suggests that different isolates have different growth dynamics in the same media. It could result in one isolate overgrowing the others during the culture of a swab carrying multiple strains and therefore inaccuracy in the detection of co-carriage.
- Further research is needed to look at the growth dynamics of the isolates when grown together.