



# Genomic comparison of invasive and colonizing isolates in patients hospitalized with methicillin-resistant *Staphylococcus aureus* bacteremia

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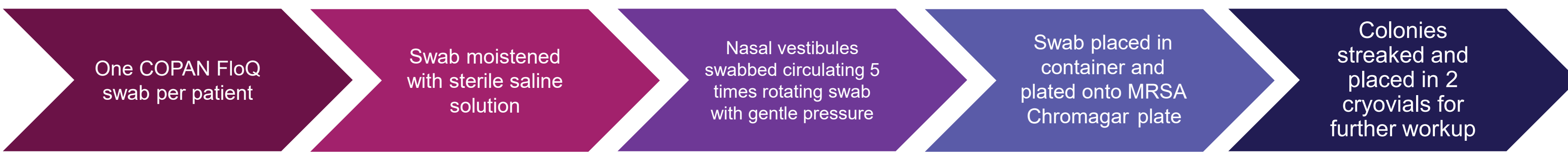
Poster 204

## Introduction

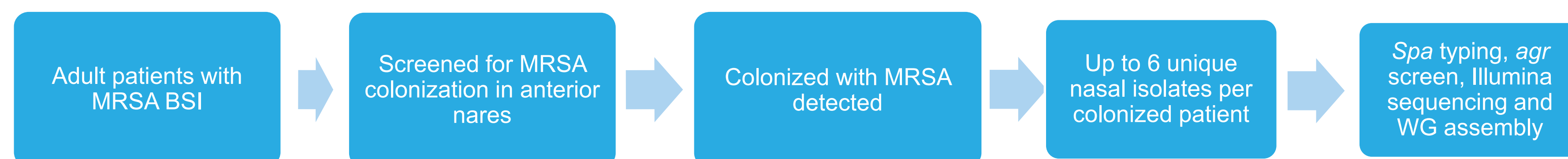
- Methicillin-resistant *Staphylococcus aureus* (MRSA) is a common cause of health-care associated infections, particularly bloodstream infections (BSI).
- Concomitant colonization of the anterior nares has been shown to have implications on persistence, recurrence, and transmission events.
- We performed genomic comparisons between paired nasal and blood MRSA isolates obtained from the same patients to identify recurring mutations that may be involved in virulence and invasion.
- Identification of recurrent mutations could signal within-host adaptation.

## Methods

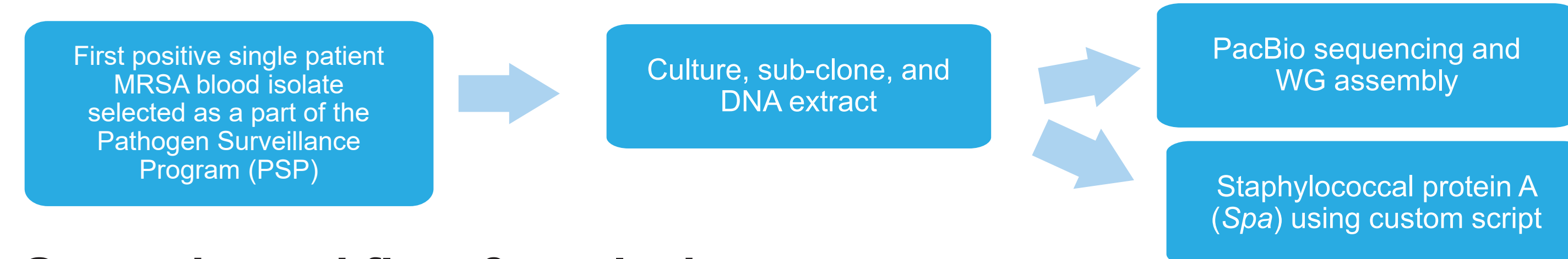
### Nasal colonization screening process:



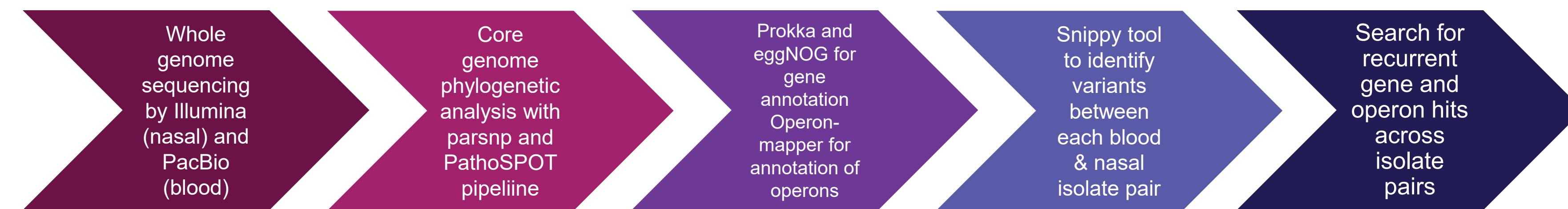
### Nasal isolates workflow:



### MRSA BSI isolates workflow:

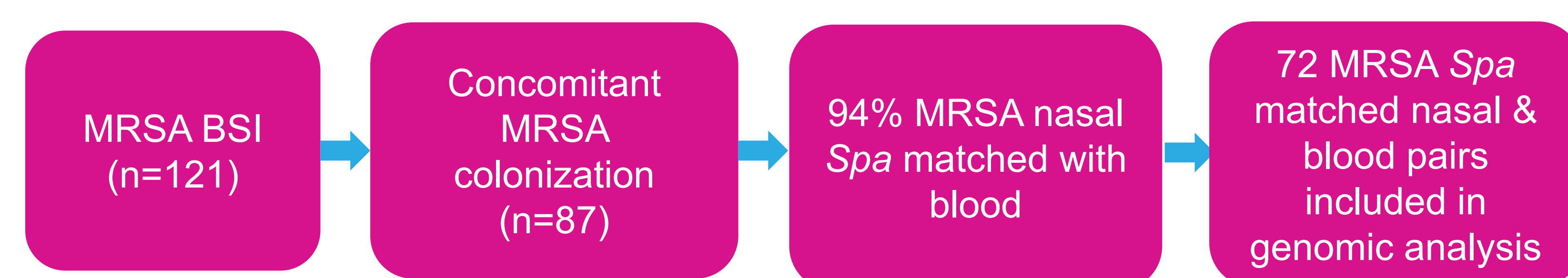


### Genomic workflow & analysis:



## Results

### Blood & Nasal MRSA pairs:



## Results

Figure 1. Phylogenetic tree of 72 MRSA blood & nasal pairs

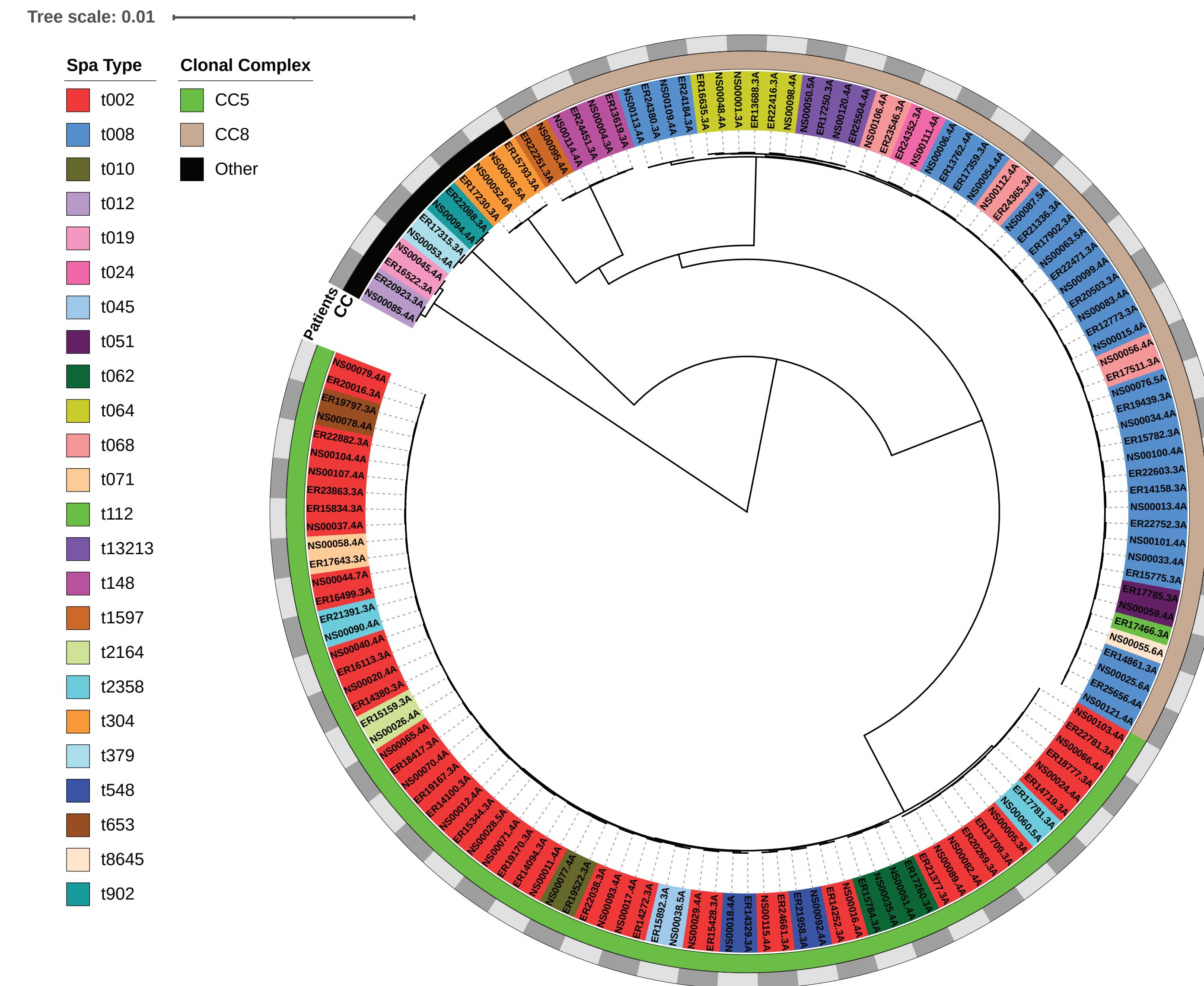
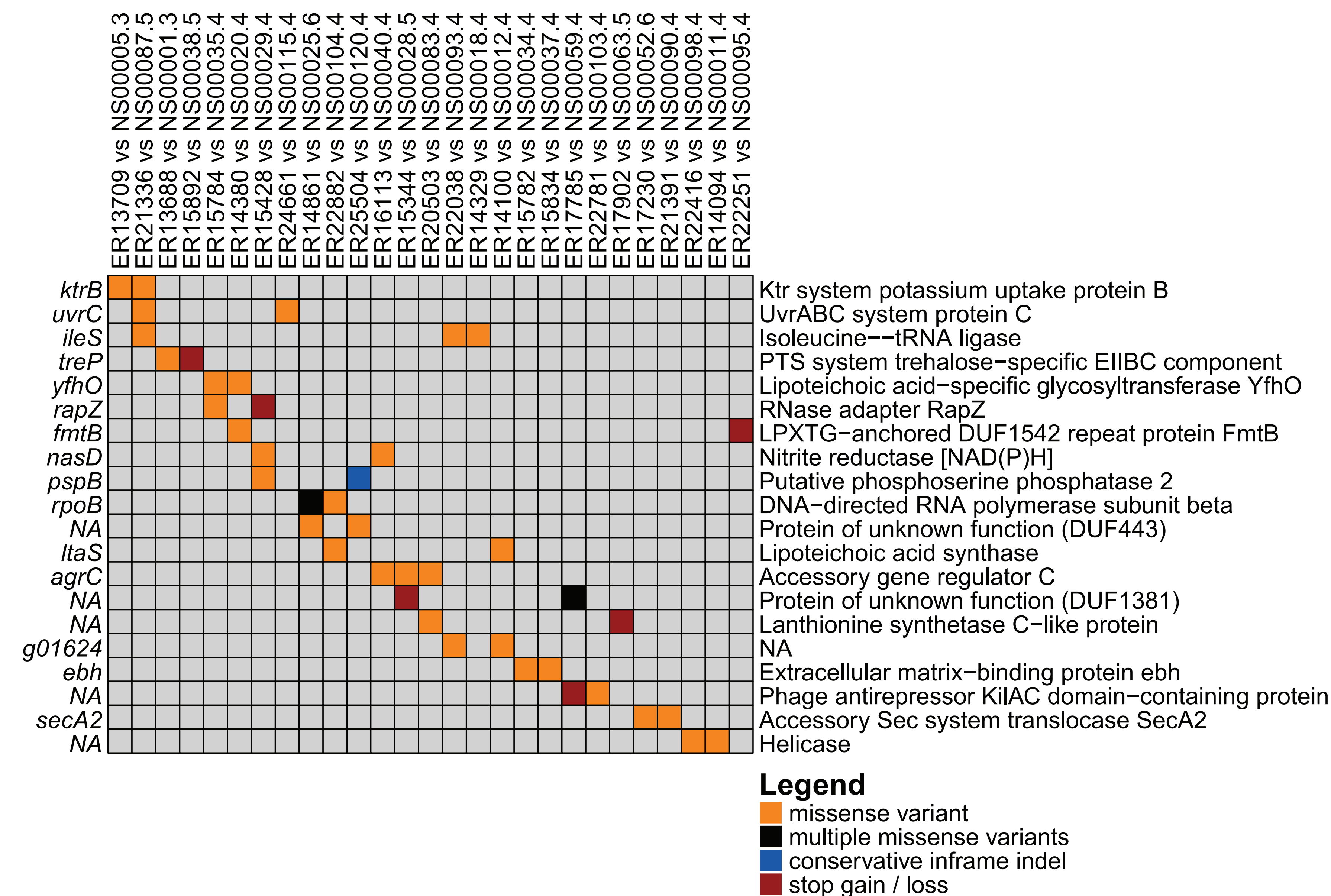
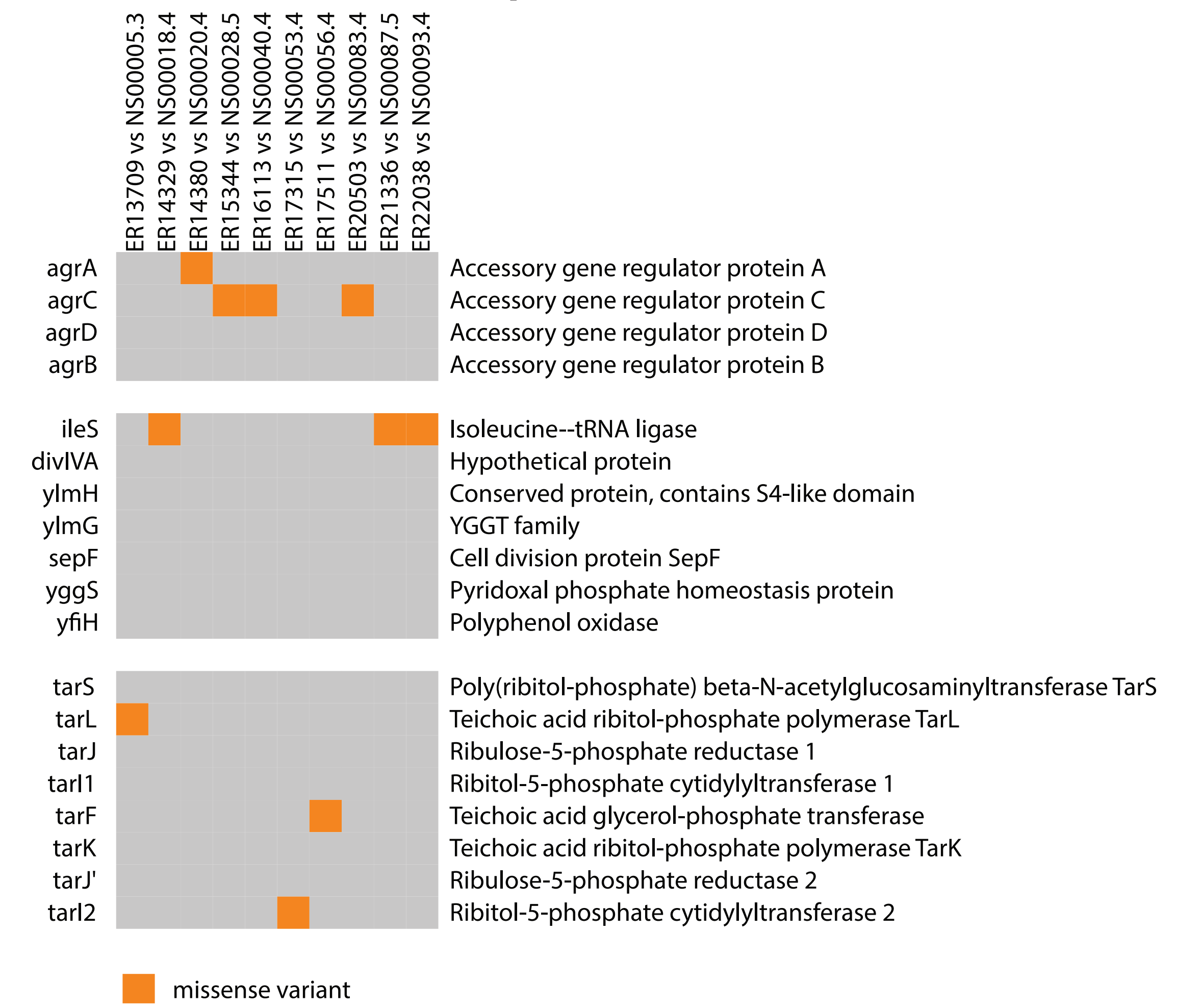


Figure 2. Recurrent mutations in two unique blood & nasal pairs



## Results

Figure 3. Recurrent mutations within operons in 3 MRSA blood & nasal pairs



## Conclusions

- Colonization is an important component of invasive *S. aureus* disease, and we evaluated paired nasal and blood isolates to determine differences between them and the recurrence of impacted genes, which may signify host-adaptation.
- Among 27 patient pairs, there were 20 genes recurring in more than one pair that were involved in sensitivity to oxacillin, susceptibility to complement-mediated immunity, and survivability in blood.
- Mutation types were impactful and varied across genes, including missense, in-frame indels, and stop/gain losses.
- At the operon level, 10 patient pairs had 3 recurrently impacted genes with missense mutations in *agr*, *ileS*, and *tar* operons that have been associated with virulence, mupirocin resistance, and cell membrane synthesis.

## References

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This research was supported in part by R01 AI119145 (H.v.B.). Dr. Altman has received institutional funding and funding from participation in ContraFect corporation clinical trials.