INTERACTIONS OF *Pseudomonas aeruginosa* AND *Staphylococcus aureus* IN BIOFILM-RELATED INFECTIONS: INSIGHTS THROUGH NETWORK RECONSTRUCTION AND CREATION OF A NEW ONLINE DATABASE

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**POLYMICROBIAL BIOFILMS**

Biofilms are a critical concern for many biomedical applications. Their natural polymicrobial nature is characterized by complex communities, where pathogen interactions promote disease progression and severity. Inter-species communication within biofilms is majorly regulated by quorum-sensing, making it a promising target for new therapies.

**GOAL**

- Understand the implications of *P. aeruginosa* - *S. aureus* interactions on infection progression and find key mechanisms to be explored for antimicrobial therapy.

**OBJECTIVES**

- Retrieve and analyse all available experimental data on *P. aeruginosa* - *S. aureus* interactions.
- Map interaction mechanisms and make them available online.
- Integrate the retrieved data with other databases to check for possible antimicrobials.

**RESULTS**

*1st Publicly Online Database on Microbial Communication*

**STEP 1 Choose Interaction Direction**

**STEP 2 Choose Source Entity Category**

**STEP 3 Choose Target Entity Category**

Two keywords below to further narrow down your search:

- Target organism (e.g. *P. aeruginosa*, *S. aureus*), disease (e.g. respiratory disease), etc.
- Target process (e.g. transcription, translation, protein synthesis, etc.)
- Target key pathway (e.g. quorum sensing, biofilm formation, etc.)
- Target drug (e.g. antimicrobial, antibiotic, etc.)
- Target microorganism (e.g. *P. aeruginosa*, *S. aureus*, etc.)

**150 PAPERS**

**55 PAPERS**

**Network Reconstruction**

**Database Construction**

**Data Integration**

**Methods**

- Retrieval of PMID List
- Relevance Classification
- Systematic Information Annotation
- Interactions, entities, strains, diseases, experimental methods, etc...

**Effect of *P. aeruginosa* on *S. aureus***

- Identification of major molecular players in *P. aeruginosa*- *S. aureus* communication (e.g. PQS system)

**Inhibitors of Major *P. aeruginosa* Virulence Factors**

- 54 different agents retrieved from the PCQuorum database.
- 32% of natural origin.

**CONCLUSIONS**

- This work successfully and comprehensively analyzed all current data on *P. aeruginosa* – *S. aureus* interactions.
- The first online database on bacterial communication was created and key molecular players were pointed out as promising targets for therapy.

**Acknowledgements**

This work was supported by the Portuguese Foundation for Science and Technology (FCT) under the scope of the strategic funding of UID/BIO/04469/2013 unit; European Regional Development Fund under the scope of Norte2020 – Programa Operacional Regional do Norte for the BioCellNet operation (NORTE-01-0145-FEDER-028084), COMPETE2020 and FCT for the project POCI-01-0145-FEDER-028184. The authors also thank FCT for the PhD Grant of Andreia Patricia Magalhães (grant number SFRH/BD/132025/2017) and ESCLM for the Young Scientist Members Attendance Grant of Paula Jorge.