KU LEUVEN

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Antimicrobial production in nontoxigenic *C. botulinum*

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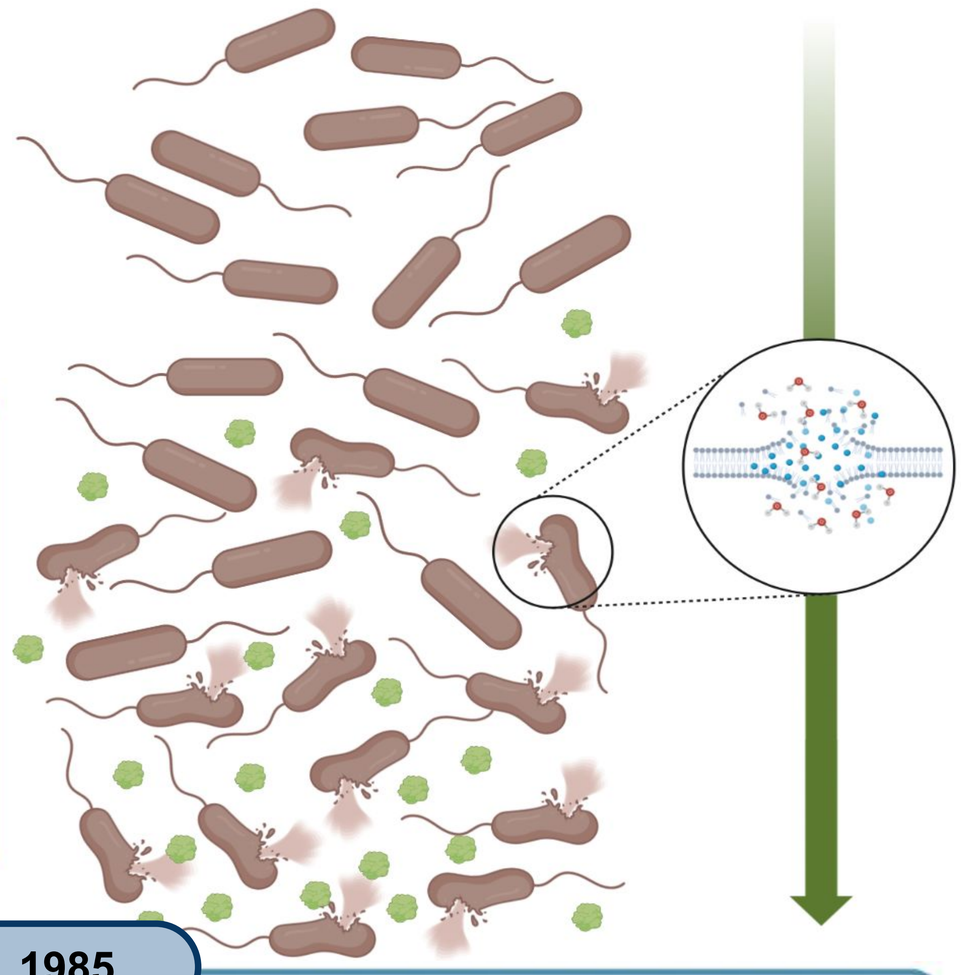


Problem: Rise of antibiotic resistance and slow development of novel antimicrobial compounds. Focus to unknown and unexplored antimicrobial agents like bacteriocins as an alternative.

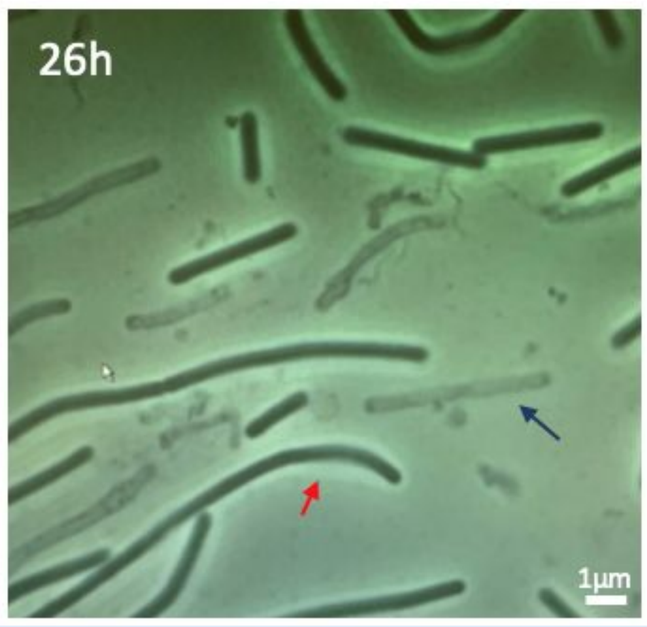
Goal: Use of *C. botulinum* for identification of novel antimicrobial compounds, characterazation and unraveling the mode of action of the detected compounds.

Experimental setup: Halo assays to determine antimicrobial activity, bioinformatics to identify potential responsible biosynthetic gene cluster, sensitivity analysis to ascertain compound characteristics and microscopy to observe the mode of action.

HA1

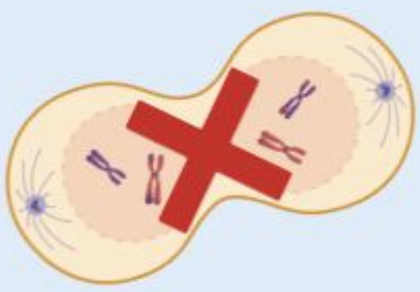
Antimicrobial Activity

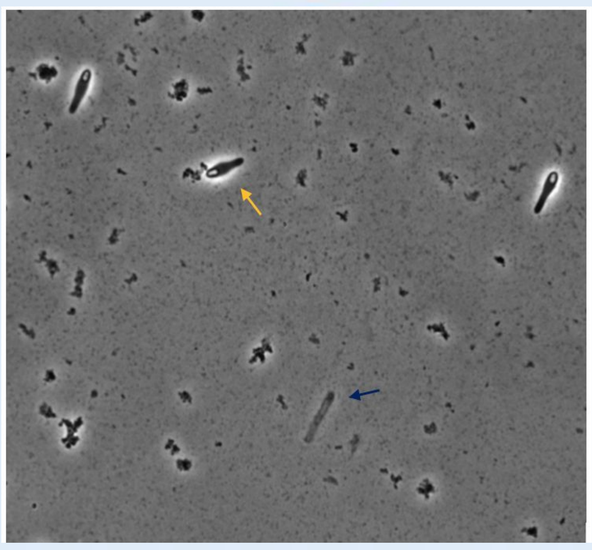
Group I and Group II
Multiple Compounds
Bacteriocidal
Cytokinesis - Swelling
Normal & Sporulating cells



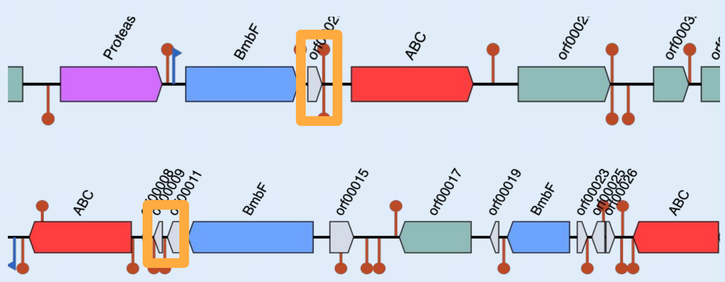
MIC

80 AU/ml





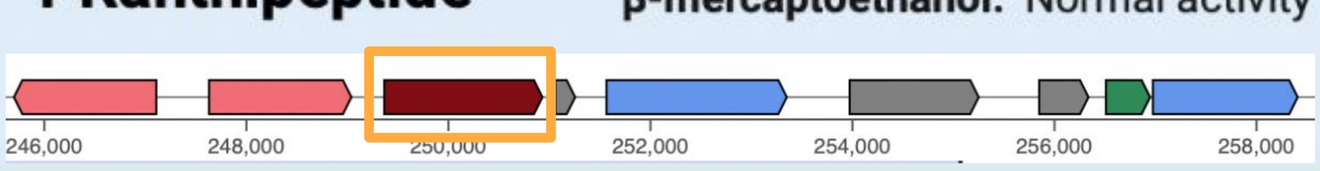
2 Sactipeptides



Characterization

Heat: Decreased activity
Cold & UV: No activity
Proteinase K: No activity
β-mercaptoethanol: Normal activity

1 Ranthipeptide

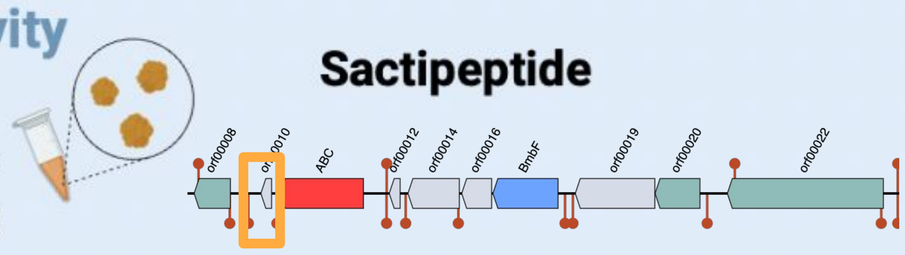


ZO42

Antimicrobial Activity

Group I and Group II

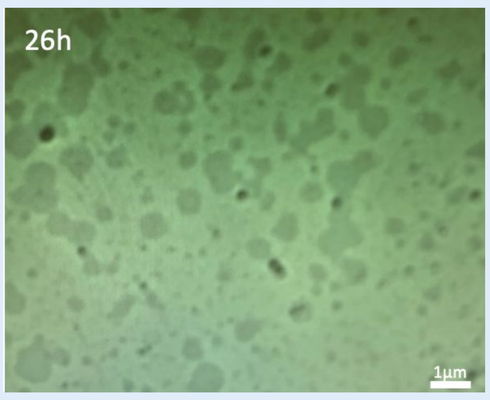
Challenge: Isolation of Antimicrobial Compound

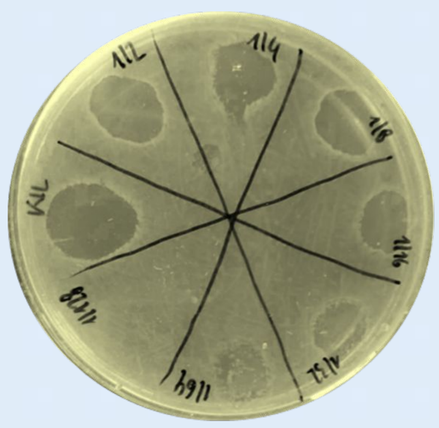


1985

Antimicrobial Activity

Group I and Group II
Bacteriocidal
Very potent

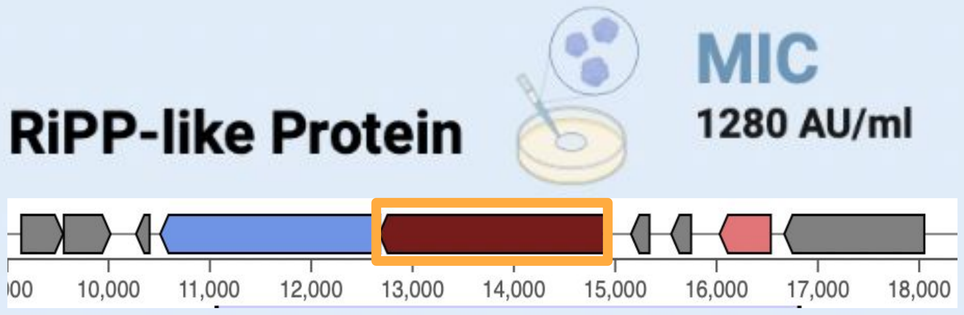




Characterization

Heat: Normal activity
Cold & UV: Normal activity
Proteinase K: No activity
β-mercaptoethanol: Normal activity

RiPP-like Protein



MIC

1280 AU/ml

Conclusion

Nontoxigenic *C. botulinum* can be used for production of novel antimicrobial agents.

HA1: Three BGCs, at least two dinstinct compounds of which at least one is secreted into supernatant resulting in cell elongation and cell lysis of both normal and sporulating cells.
1985: One BGC encodes a potent and robust agent which causes cell lysis.
ZO42: Two BGCs, no compound in the supernatant.

Future directions

HA1*: Compound isolation, selective enzymatic treatment, and gene knockout.*
1985: *Gene knockout.*
ZO42: *Compound isolation and gene knockout.*