



UNIVERSITY OF
PLYMOUTH



Antibiotic resistant pathogens research group

Mat Upton

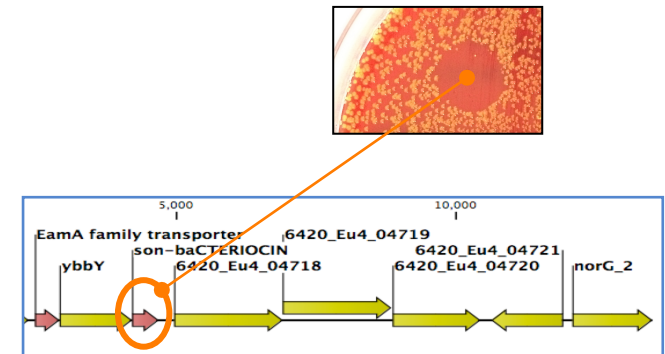
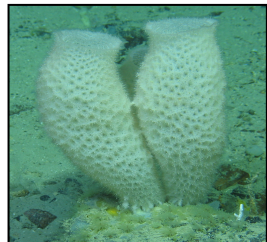
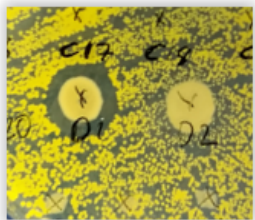
Professor of Medical Microbiology, University of Plymouth
Chief Scientific Officer, Amprologix Ltd



@mat_upton

Expertise

- Medical microbiology
- Natural product discovery & development
 - Isolation media & method optimisation, chromatography, clinical MDR strains, *in vitro* tox testing (cell lines, *Galleria mellonella*)
- Recovery of deep-sea sponges & other marine samples for NP discovery
- Bacterial genome sequencing & metagenome sequencing with *in-silico* mining for NPs
- Rational (re-)design of peptide based antimicrobials



My closing thought is that I think that 10-15 years from now we will view many non-traditional products as "business as usual."

John Rex summing up the FDA's 2018
Workshop on non-traditional approaches

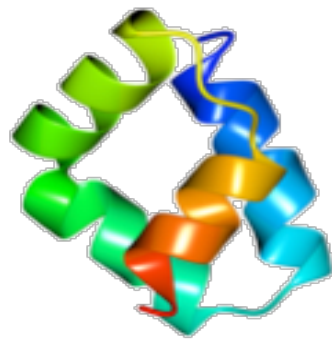
Epidermicin N101

- Rapidly bactericidal
- Very low toxicity
- Membrane active agent
- No/very limited resistance development
- Ideally suited to topical therapy



Biophysical
analysis

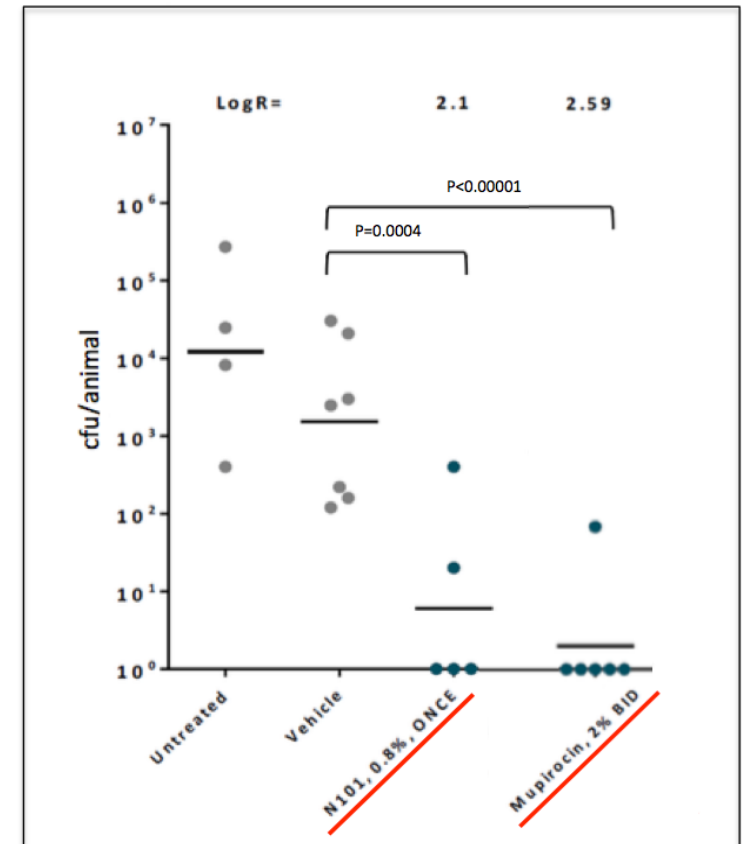
Ryadnov et al.



Crystal structure



G. mellonella



Nasal decolonisation –
unprecedented efficacy

Halliwell et al., 2017 J Antimicrob Chemother

Our resources/ expertise

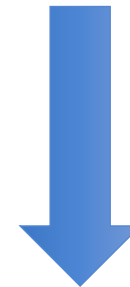
Marine ecology & sampling

Upton & Howell, University of Plymouth
Smeardon, Diving Diseases Research Centre
Allen, University of Exeter



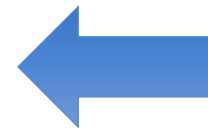
Genomics (microbial & meta-)

Upton, University of Plymouth
Farnham, University of Plymouth
Allen, University of Exeter



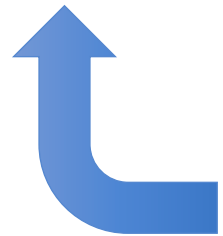
NP characterisation

Upton, University of Plymouth
Ryadnov, National Physical Laboratory



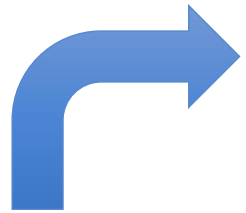
Rational design

Upton, University of Plymouth
Ryadnov, National Physical Laboratory



Industrial biotechnology

Fotheringham, Ingenza, Edinburgh



Pre-clinical development

Upton, University of Plymouth

Facilities – flow cytometry, AFM, HPLC, LC-MS/MS, DNA sequencing (minion), cognitive computing

AMR collaborations

- **Innovate UK, H&LS call**

- With Ingenza, IBM-Hartree, National Physical Laboratory
- New bacteriocins templated on epidermicin NI01



- **UK-China, Innovate UK/DHSC**

- With The Vaccine Group, Plymouth & Shanghai Vet Research Centre, China
- Developing & testing new vaccines to reduce antibiotic use in pigs



- **One Ocean Hub, UKRI GCRF**

- WP on bioactive recourses from marine environments



- **SBRI/DHSC, AMR in Humans**

- With Amprologix partners
- Pre-clinical development of epidermicin NI01



Bottlenecks/development needs

- Development downstream from recovery & preliminary purification
- Early dereplication
- Med Chem
- New approaches to systemic delivery
- Influencing funders – e.g. CARB-X

Thank you



University of
Plymouth



Garry Farnham
Florie Desriac
Martha Nash



Department
of Health &
Social Care



Innovate UK

SBRI Government challenges.
Ideas from business.
Innovative solutions.