Increasing resistance decreasing drug development

*Proportion of clinical isolates that are resistant to antibiotic. MRSA, methicillin-resistant Staphylococcus aureus. VRE, vancomycin-resistant Enterococcus. FQRP, fluoroquinolone-resistant Pseudomonas aeruginosa.

spin out company from University of St Andrews – seed investment closed Oct 2016

porous material technology pioneered by Prof Russell Morris’s group

store and release nitric oxide

prevent infection and procedural complications

urology
haemodialysis
orthopaedics
technical textiles
cardiology
wound dressings
ostomy
Nitric Oxide (NO)

“gaseous biological signalling molecule”

antimicrobial
wound healing
anti-thrombotic
vasodilatory
angiogenetic

Can its properties be harnessed for therapeutic applications?
Nitric Oxide

difficult to administer

concentration dependant

toxic in high concentration

Requirement to deliver controlled dosage for specific durations

Market seeks a SAFE and effective delivery method
Metal Organic Frameworks - MOFs
“Crystalline Sponges”

organic linker + metal ion → extended porous framework structure

1g = 1000’s m²
NO Storage-Release Cycle

A. McKinlay et al., J. Am. Chem. Soc., 2008, 130, 10440
MOFs are exceptionally proficient at disrupting and killing biofilms, far more effective than elevated doses of approved antibiotics.
Anti-thrombus Coating

NO released from coating prevents platelet adhesion
Our Story So Far

2010

2012

2014

2016

2018

- Chronic Wounds $4.5bn
- Urinary Catheters $6.0bn
- Metabolic Activity
  - MRSA
  - Blank
  - Vancomycin
  - MOF
- Incubation Time (h)
- Molecules NO
- Time (hr)
- MOFgen Biomedical Innovation
- Emerging Technologies Competition 2016
- First Prize - Health and Wellbeing Category
growing strategic partnerships with leading OEM organisations
The Spin-out Adventure
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