

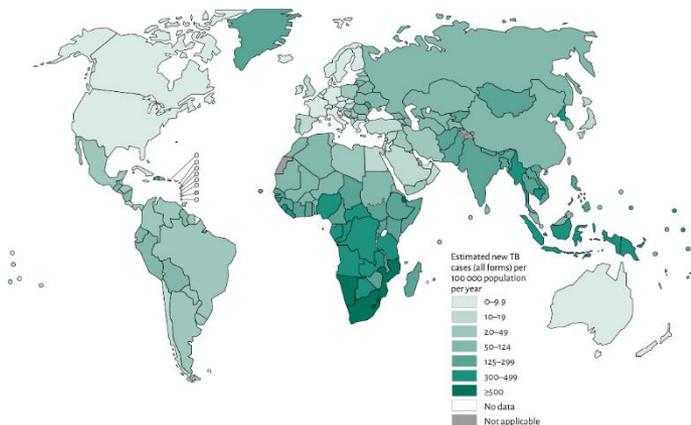


Southampton Centre for
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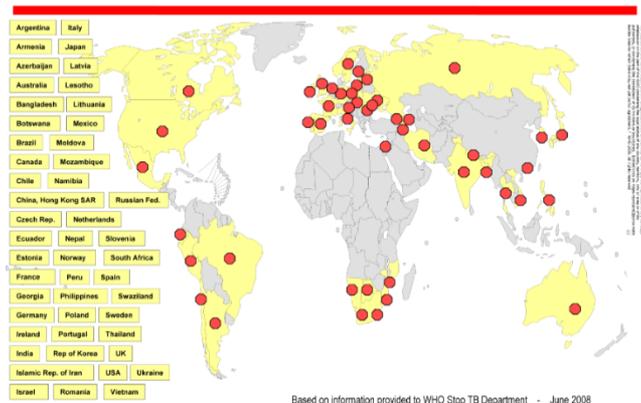
Combining biological and physical science approaches to improve tuberculosis control

Paul Elkington
Faculty of Medicine

TB drug resistance is progressing

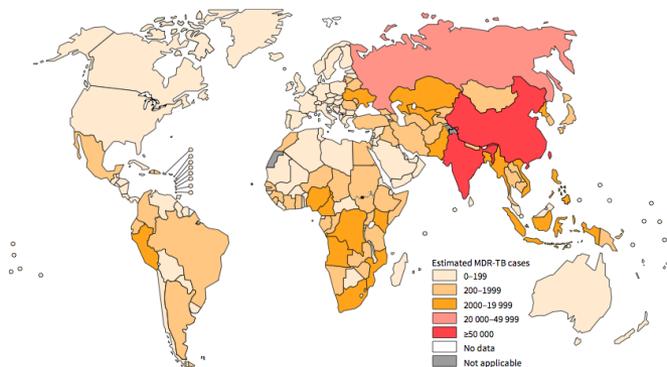


Overall TB incidence



Extensively-drug resistant TB: 2005

Number of MDR-TB cases estimated to occur among notified pulmonary TB cases, 2013



Multi-drug resistant TB: 1990's

NATURE | NEWS

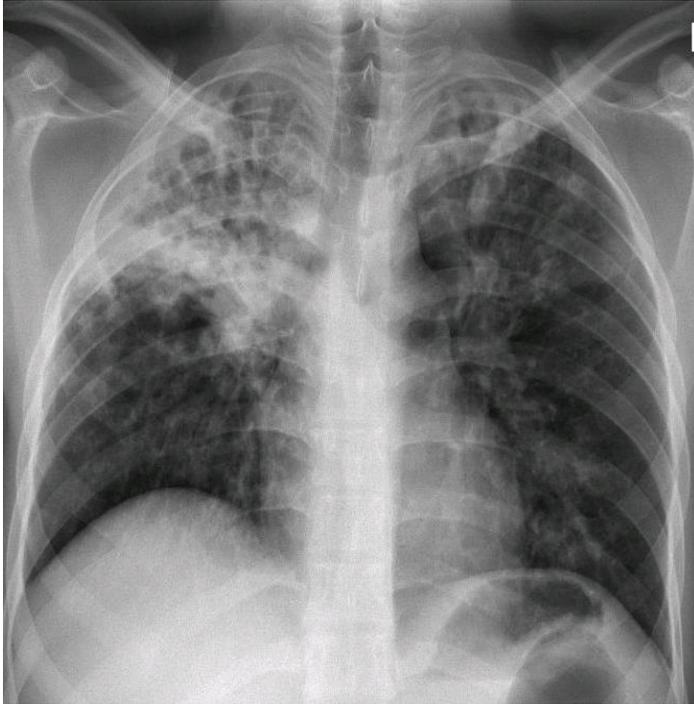
Totally drug-resistant TB emerges in India

Discovery of a deadly form of TB highlights crisis of 'mismanagement'.



Totally-drug resistant TB: 2012

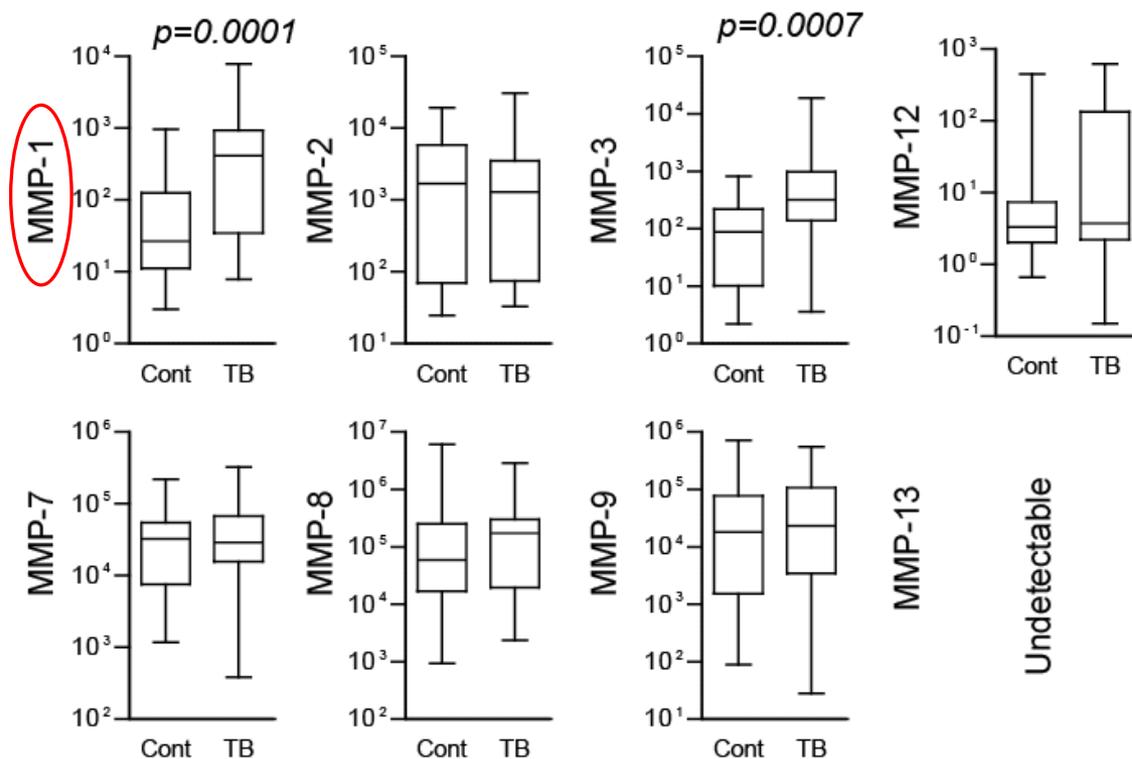
Lung destruction is key to the success of TB



6/6 sputum samples positive for bacilli

- Drives transmission
- Causes morbidity and mortality
- Suggests matrix metalloproteinase enzymes are key mediators

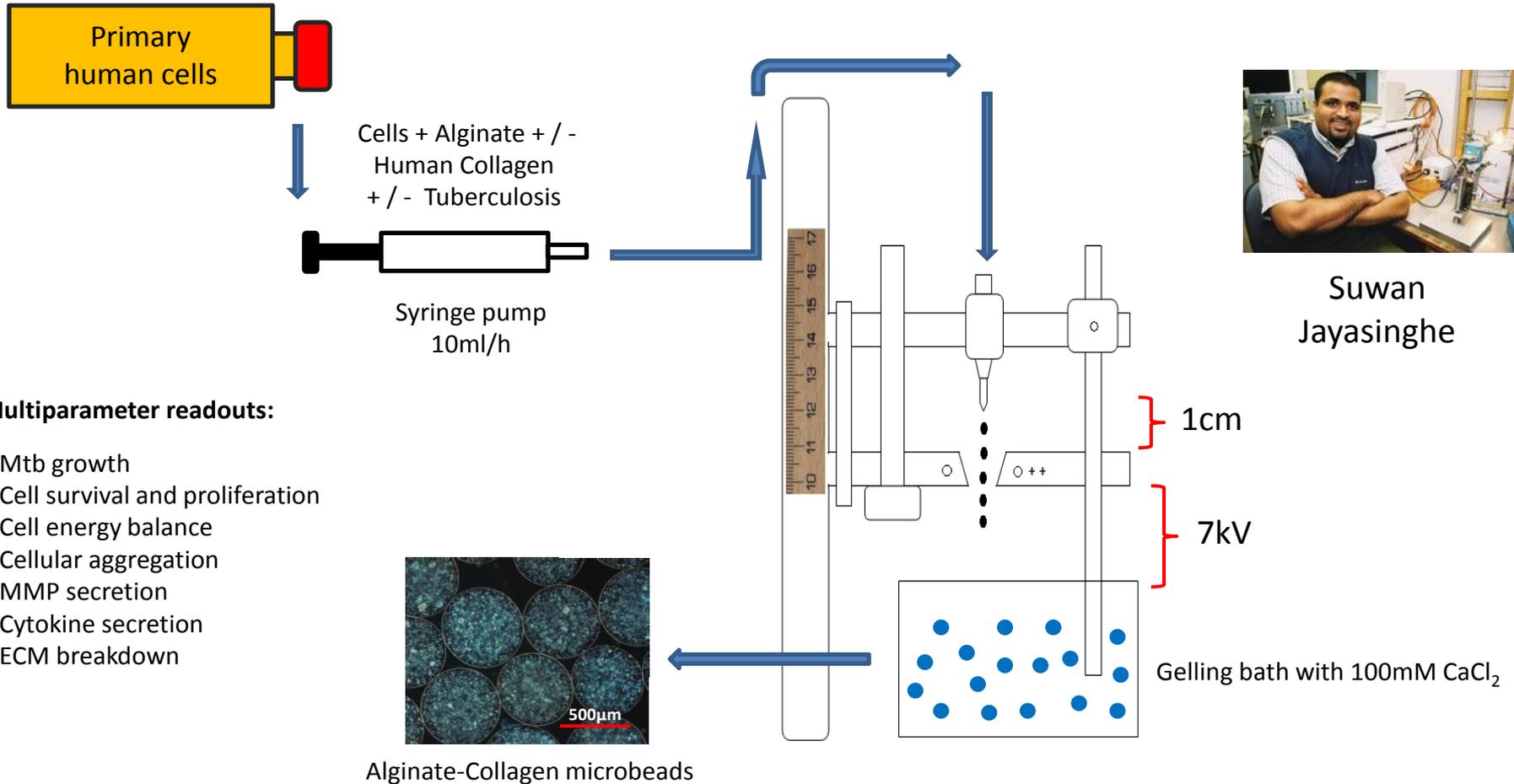
Matrix metalloproteinase-1 is the dominant collagenase causing lung destruction in TB



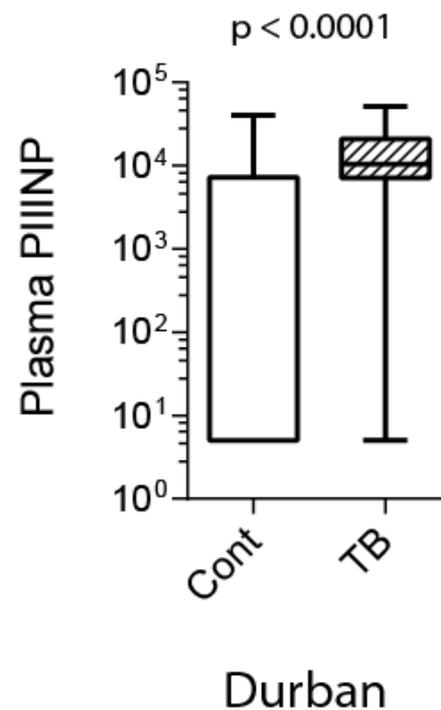
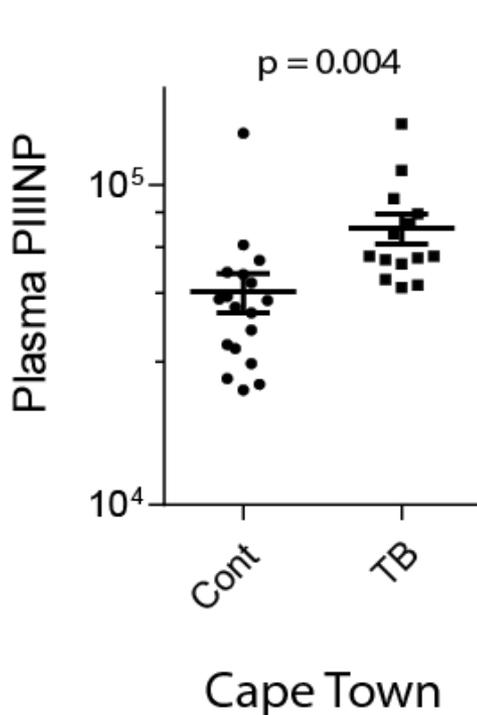
Elkington et al *J Clin Invest* 2011 121: 1827

Walker et al *AJRCCM* 2012 185: 989

Developing a 3-D model to address cell-matrix regulation of immune response to TB



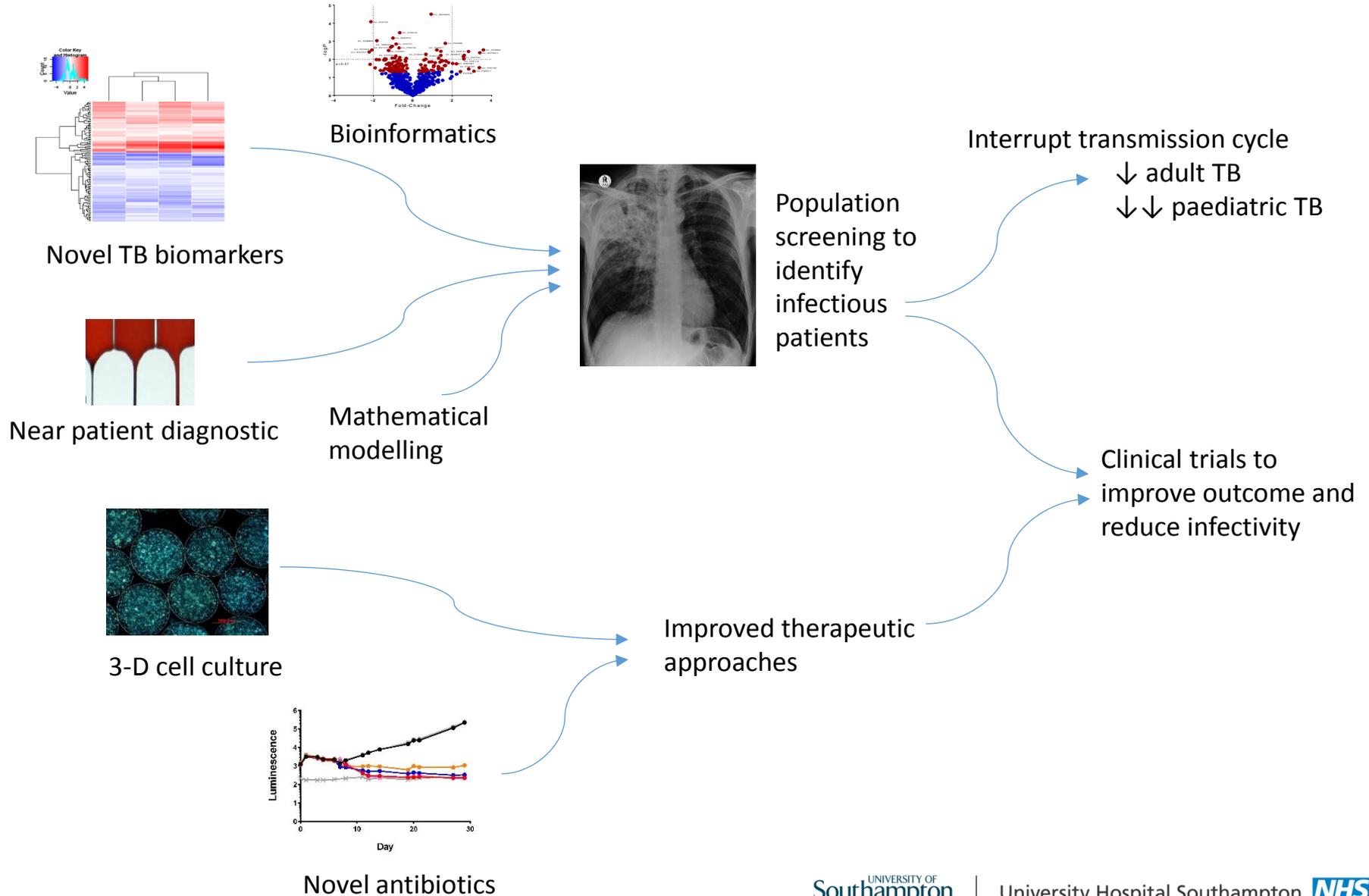
Matrix breakdown releases collagen fragments that are novel TB diagnostic markers



Seddon et al *J Infect Dis* 2013 208: 1571

Sathyamoorthy et al *PLOS One* 2015 e0117605

Southampton TB research



Acknowledgements



University of Southampton

Liku Tezera
Magdalena Bielecka
Salah Mansour
Patience Brace
Andy Chancellor
Diana Garay
Elena Konstantinopoulou
Chidinma Odoh

Imperial College

Jon Friedland
Naomi Walker

Dept of Engineering, UCL

Suwan Jayasinghe
Vicki Workman

Public Health England, Porton Down

Ann Williams
Simon Clark

University of Cape Town

Rob Wilkinson
Graeme Meintjes

K-RITH, Durban

Victoria Kasprovicz

Collaborators

Christopher Woelk
Spiro Garbis
Christine Currie
Xunli Zhang
Robert Zmijan

**All the patients who
have taken part**

