



KAMPALA, UGANDA March 4-7, 2019


## *The Second Global NAMRIP conference*

*Innovations Towards Combating AMR: A Whole Society Engagement*



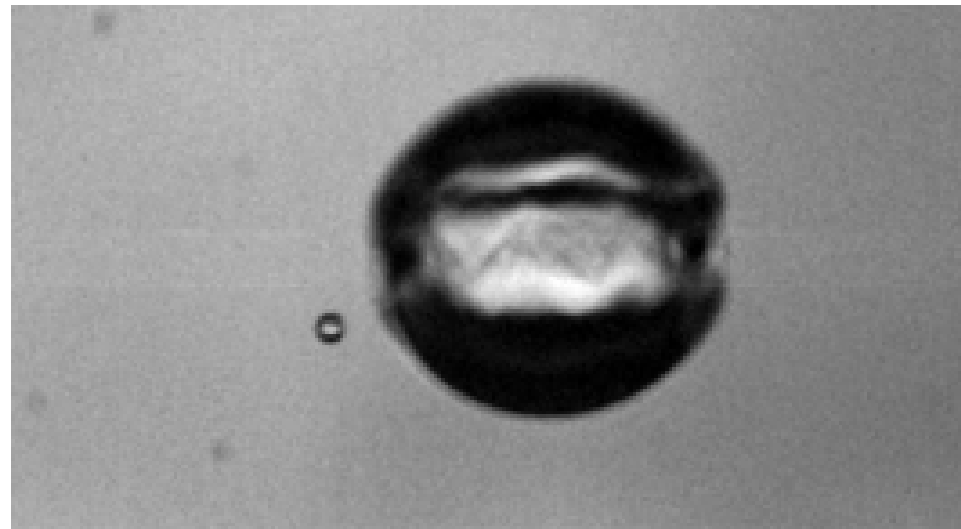
# Wound Healing and Cleaning with just water, air and sound

Timothy Leighton FRS FREng FMedSci ScD

 @Prof\_Leighton

## Shimmering bubbles

**Cold water cleaning:** No additives, no heating



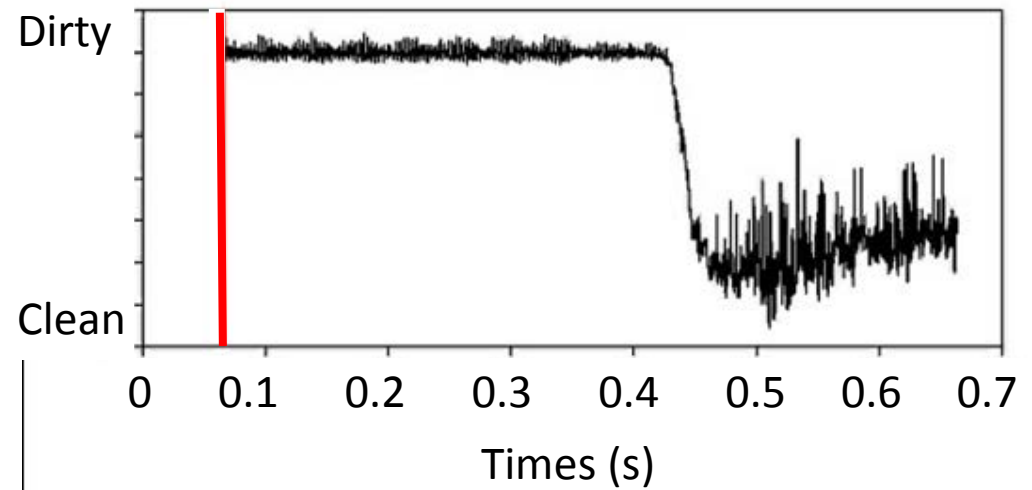
3000 fps  
1/44000 sec  
+00:00:00.066333sec

Sticky contaminant

Pore →

Glass

← Cleanliness sensor



## Two die in E. coli outbreak linked to salad leaves

By PRESS ASSOCIATION

PUBLISHED: 14:04 EST, 18 July 2016 | UPDATED: 14:04 EST, 18 July 2016



Two people have now died after becoming infected with E. coli that may be linked to eating mixed salad leaves.

Public Health England (PHE) is investigating an outbreak of E. coli O157, which has so far affected 151 people, mainly in the South West.

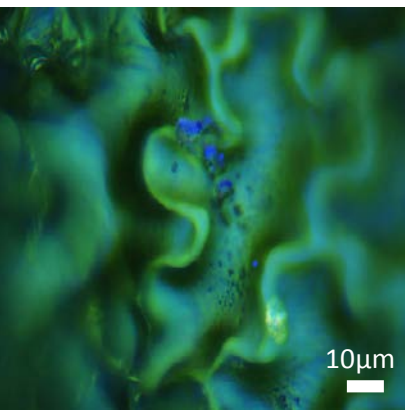
There have been 144 cases in England, six in Wales and one in Scotland. PHE did not say when the two people died.



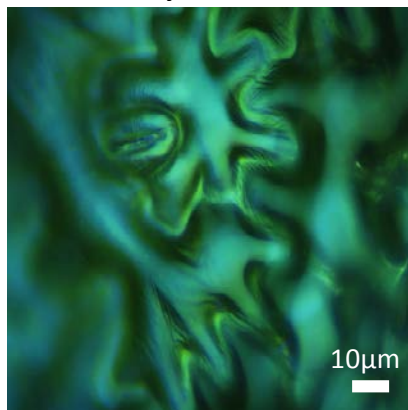
Experts are trying to trace the source of the E. coli outbreak



Ready-to-eat Basil



1 minute cold water



1 minute StarStream

+ 1 day

+ 2 day

+ 4 day

+ 7 day



Untreated control



Starstream spot clean

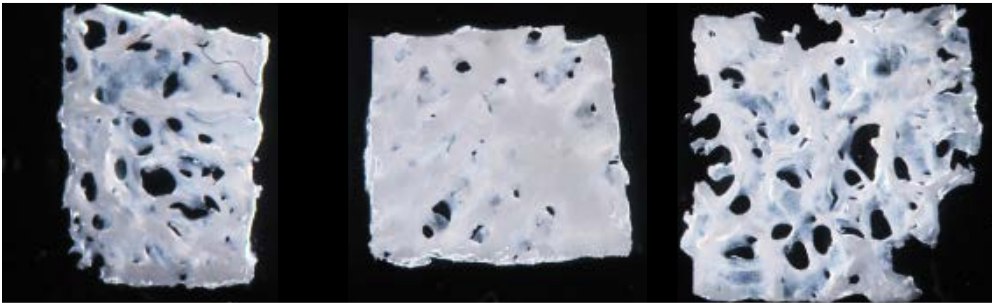


Starstream full clean





No wash



1 week  
 $H_2O_2$



20 min  
 $H_2O_2$



20 min  
StarStream

*Streptococcus mutans*



Before...



Water  
wash...



StarStream  
(cold water  
and no  
additives)



HEALTH • RESEARCH

# One-Third of the World's Population Suffers From Untreated Tooth Decay



Echo—Cultura RF/Getty Images

By **SABRINA TOPPA** March 5, 2015

TIME  
Health

For more, visit [TIME Health](#).

Untreated tooth decay is a problem for more than 2.4 billion people worldwide, with some 190 million new cases forecasted each year, [finds](#) a new study in the *Journal of Dental Research*.

Experts say this is a worryingly large number for a problem that is both well known and highly preventable.

“It is alarming to see prevention and treatment of tooth decay has been neglected at this level,” says the study’s lead researcher, Dr. [Wagner Mergon](#).

## *Streptococcus mutans*



Before...



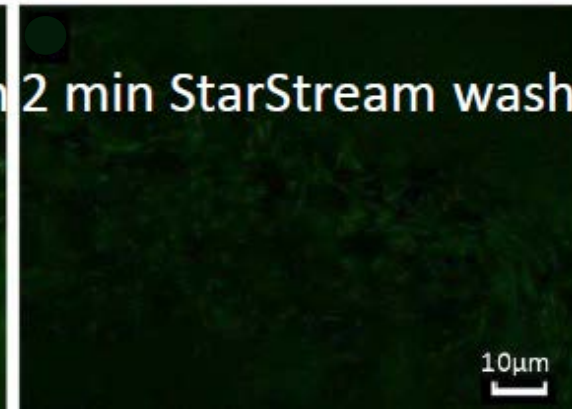
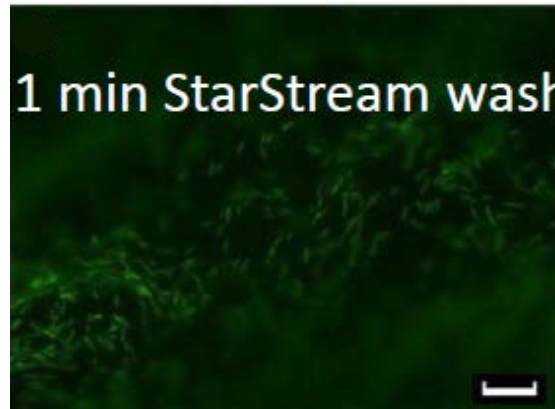
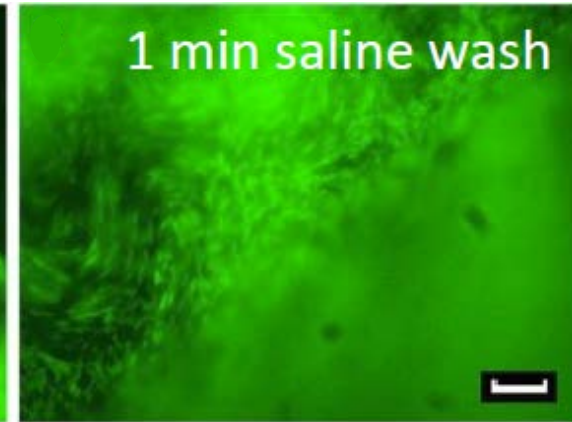
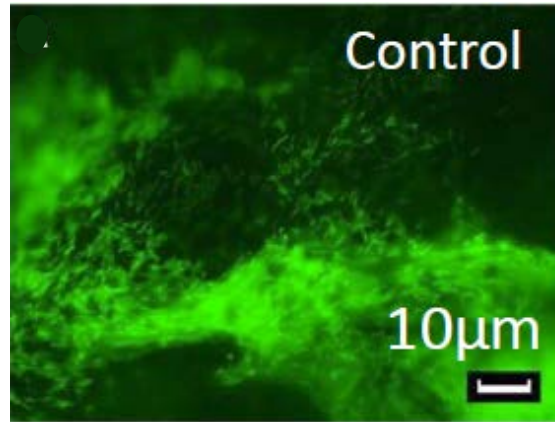
Water wash...



StarStream  
(cold water  
and no  
additives)

~~Animal (dead)~~

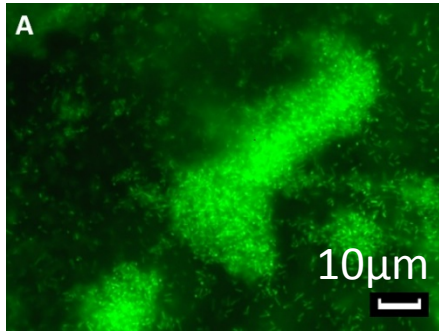
Human (live)



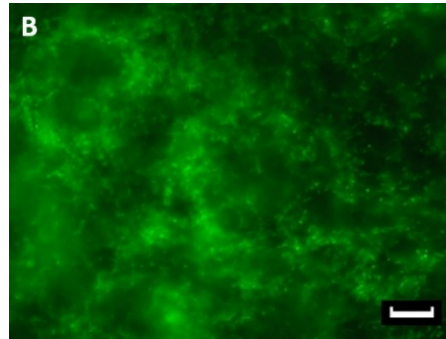
***Pseudomonas aeruginosa***, a multidrug resistant pathogen, common cause of hospital-acquired infections, transmitted by hands

↓  
USA each year { 2 million patients annually infected  
90,000 deaths annually  
\$28 billion to \$ 45 billion

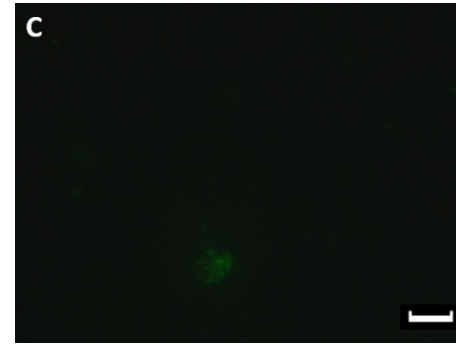




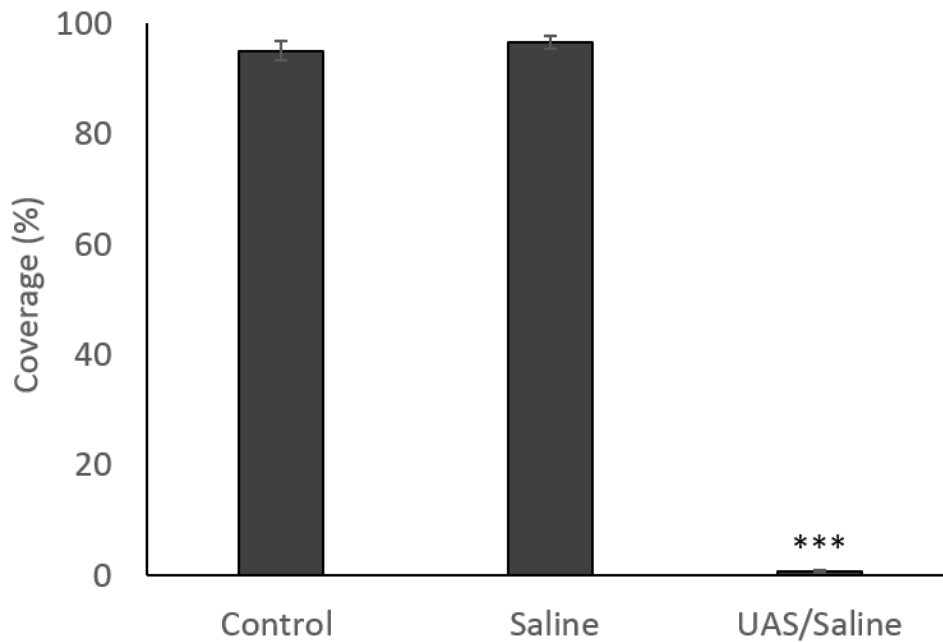
Control



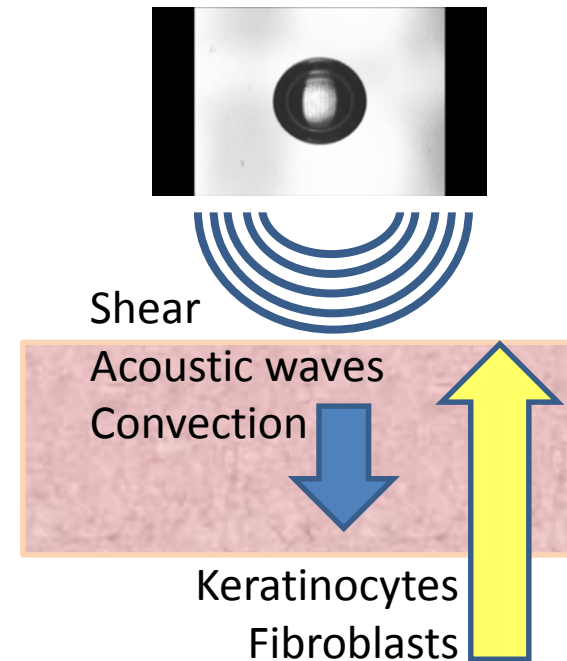
1 min saline wash



1 min Starstream

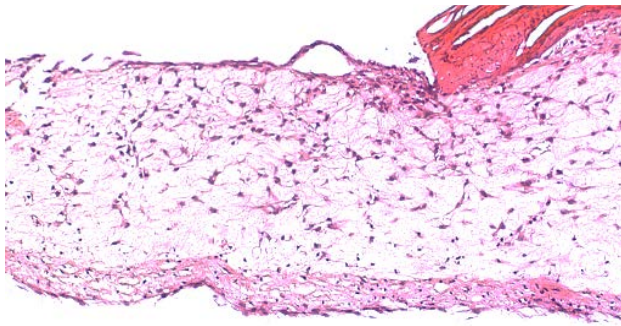


Error bars represent SEM (N=3), One way ANOVA/Tukey post hoc test \*\*\* =  $p \leq 0.001$  compared to non-treated controls

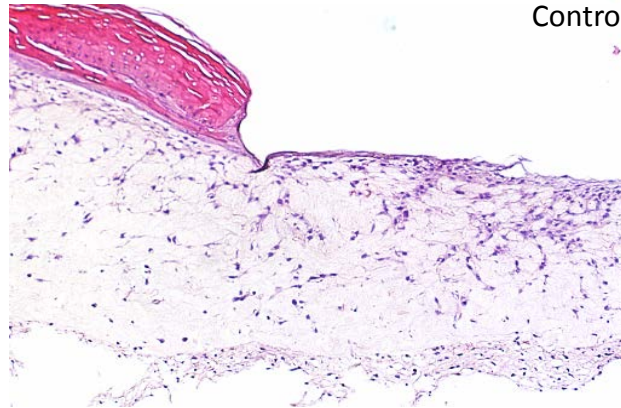


Matrix metalloproteinases (MMPs)

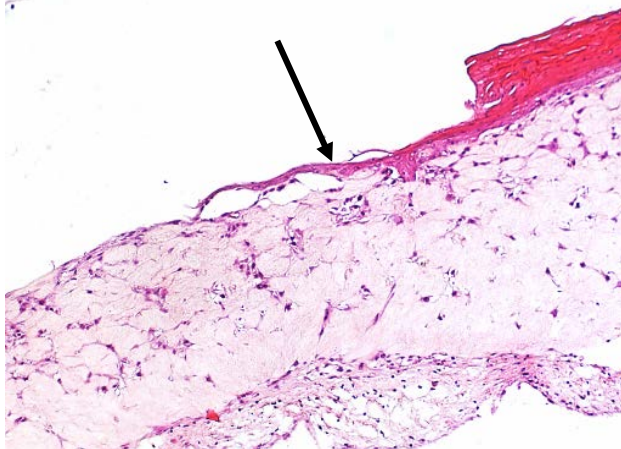




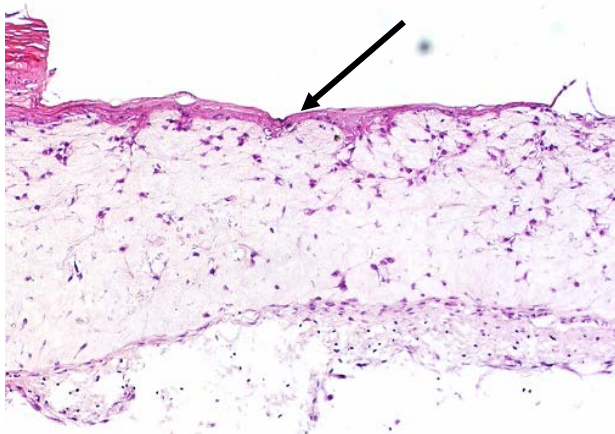
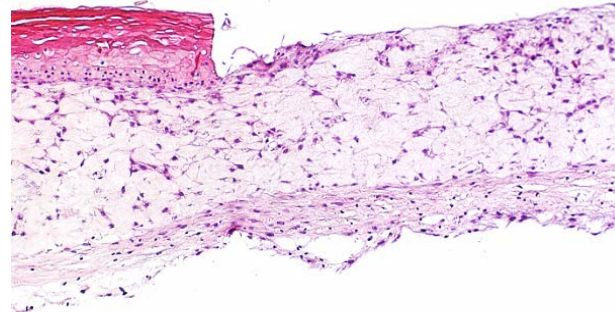
Control (No treatment) +7d



Saline (2 min) +7d



StarHealer (2 min) +7d

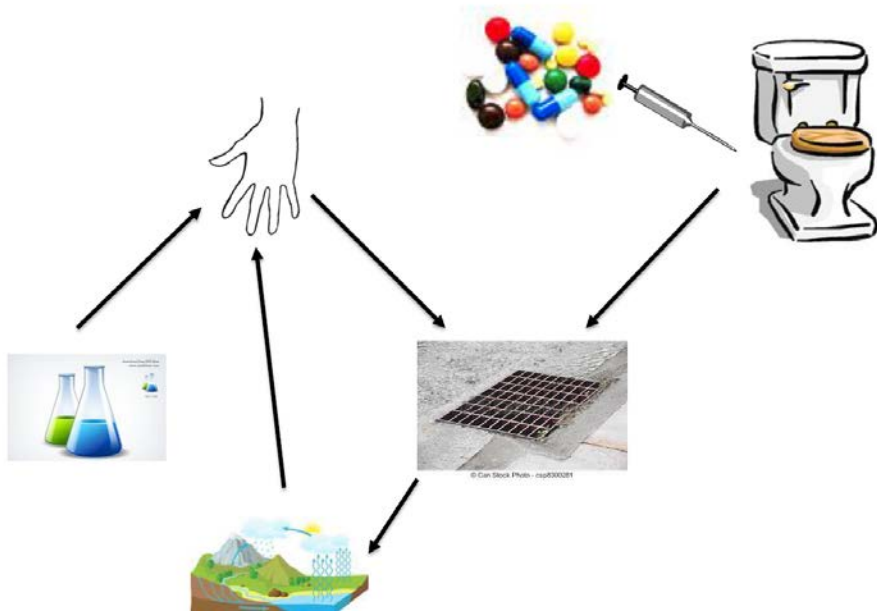


Our skin is  
our shield:  
Hugely  
accelerating  
its growth  
after  
wounding  
using just  
saline, air  
and sound

Haematoxylin and Eosin  
(H&E) stained sections from  
the Epiderm full thickness  
wound models

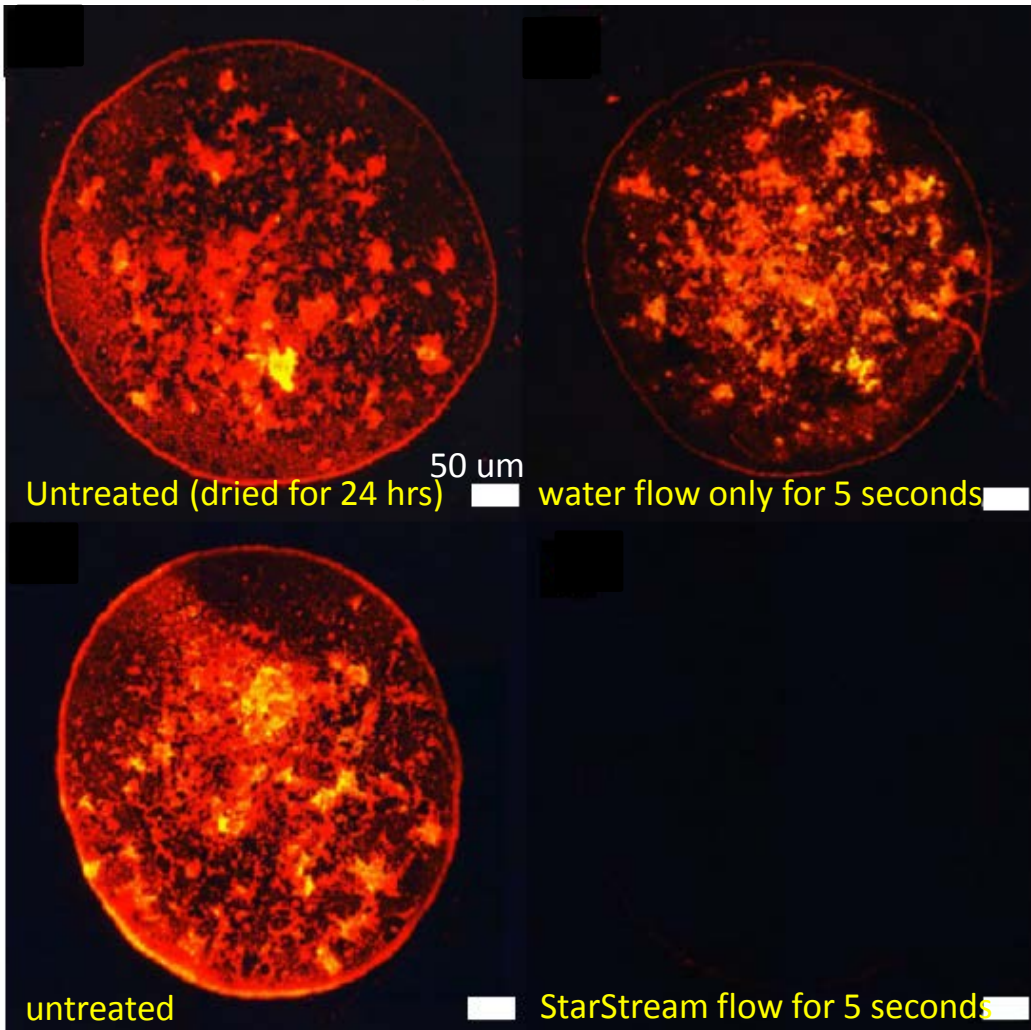
Example H&E stained  
sections (4 $\mu$ m) taken from  
the EFT wounds 7 days post  
cleaning

## Handwashing and wound cleaning



It is not specific in the same way as  
an antibiotic:  
Works for bacteria,  
fungi  
viruses, parasites





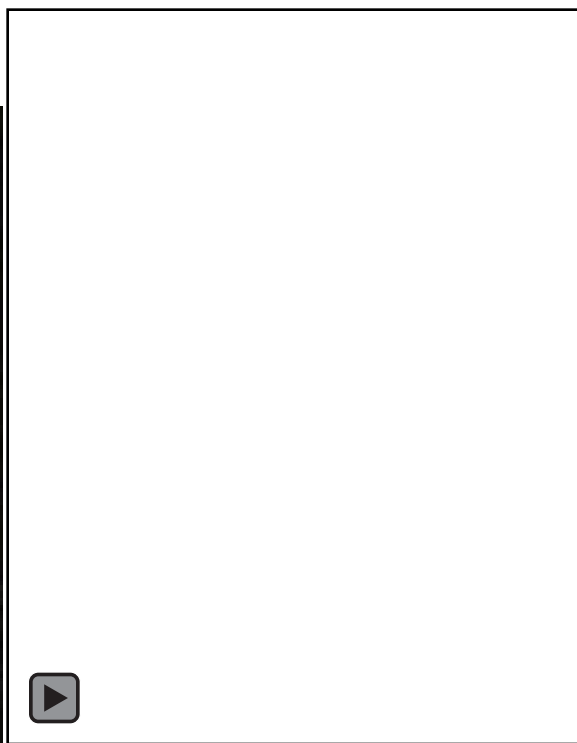
SPRO Ruby stained protein on  
**NHS** surgical steel



**NHS**







Firefighters use the hose from their engine to douse the young man in water



New company to build these devices:  
Sloan Water Technology Ltd

Thanks to:

- M. Zhu
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- C. Highmore
- R. Herve
- C. Hand
- K. Harling
- C. Dolder
- C. Cox
- B. Chong
- P. Birkin