How can researchers prepare to make the switch to open science?

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University of Auckland

@SiouxsieW

THE UNIVERSITY OF AUCKLAND
Te Whare Wānanga o Tāmaki Makaurau
NEW ZEALAND

MEDICAL AND HEALTH SCIENCES

BIOLUMINESCENT SUPER BUGS LAB

Who?

@SiouxsieW

www.superbugslab.org

BIOLUMINESCENT SUPER BUGS LAB

Image credit:
Maki Naro

Who?

Bioluminescent Superbugs Lab

www.superbugslab.org

Image credit:
Maki Naro

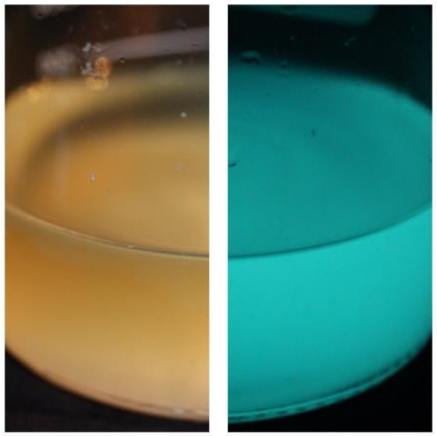
Hunting for new antibiotics!

Dr Bevan Weir

*Gross misrepresentation of the fungi in the ICMP…

Manaaki Whenua Landcare Research

BIOLUMINESCENT SUPER BUGS LAB



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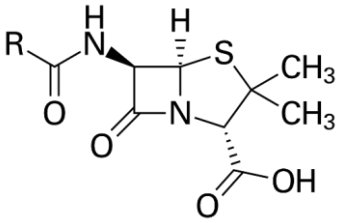
Prof Brent Copp



*Hopefully not just penicillin again and again…

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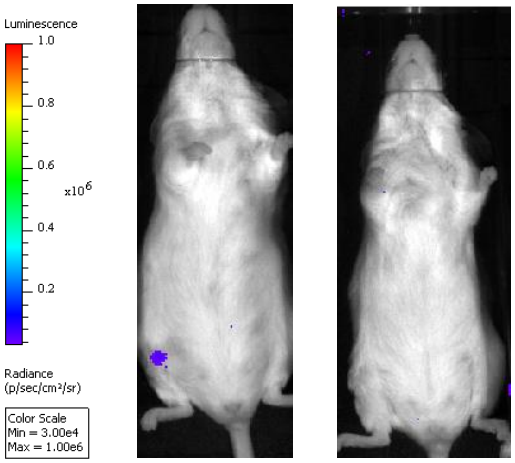
Making surgery safer?

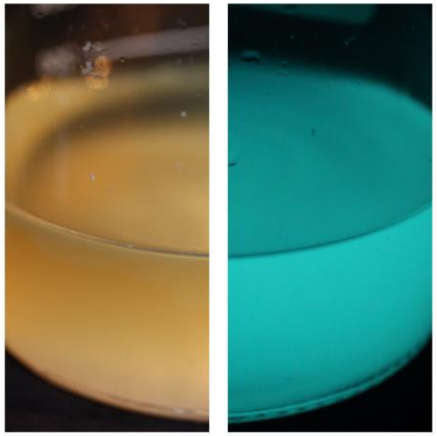
Dr Simon Young

Traditional New



Young et al (2015). Clinical Orthopaedics and Related Research. 473(11):3573-84.

BIOLUMINESCENT SUPER BUGS LAB



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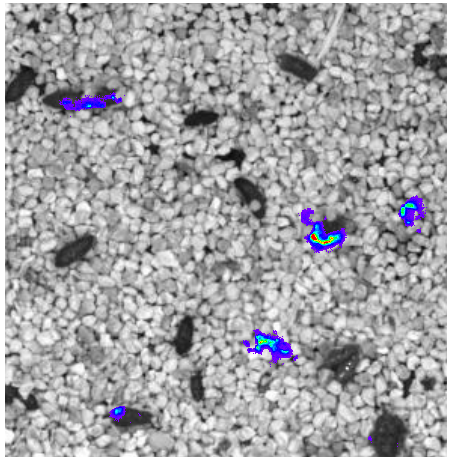
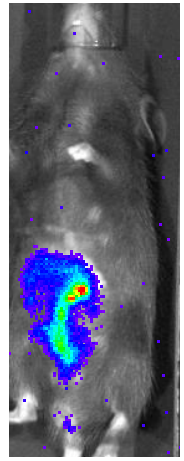
What makes a microbe infectious?





How we science!

$$$

Image credit:
https://empoweryourknowledgeandhappytrivia.wordpress.com/2016/06/

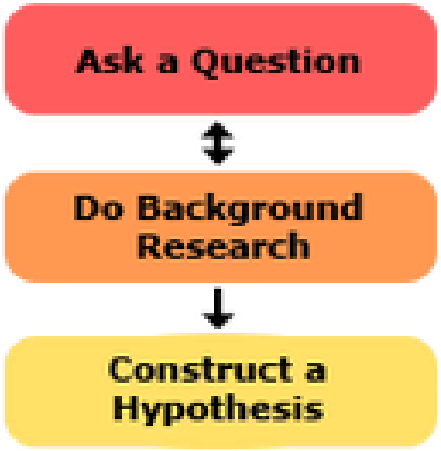
BIOLUMINESCENT SUPER BUGS LAB

How we science!

Communicate Results

BIOLUMINESCENT SUPER BUGS LAB

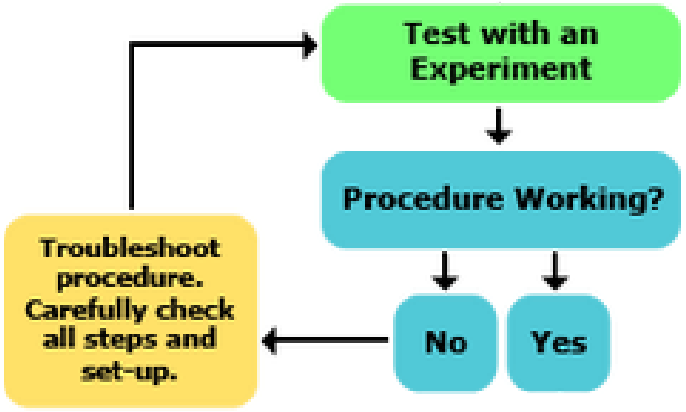
How we science!



What's published/available?

BIOLUMINESCENT SUPER BUGS LAB

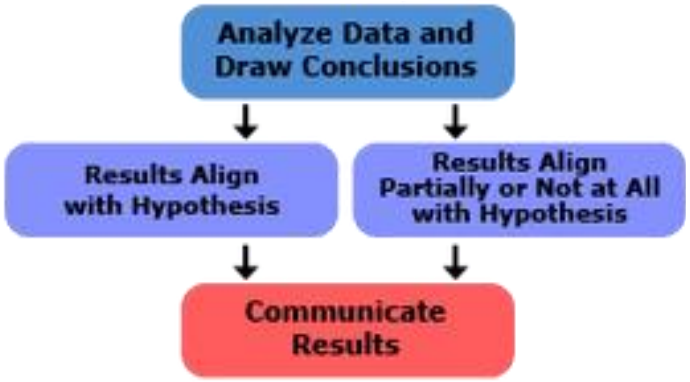
How we science!



What's published/available?

BIOLUMINESCENT SUPER BUGS LAB

How we science!



Warts and all?

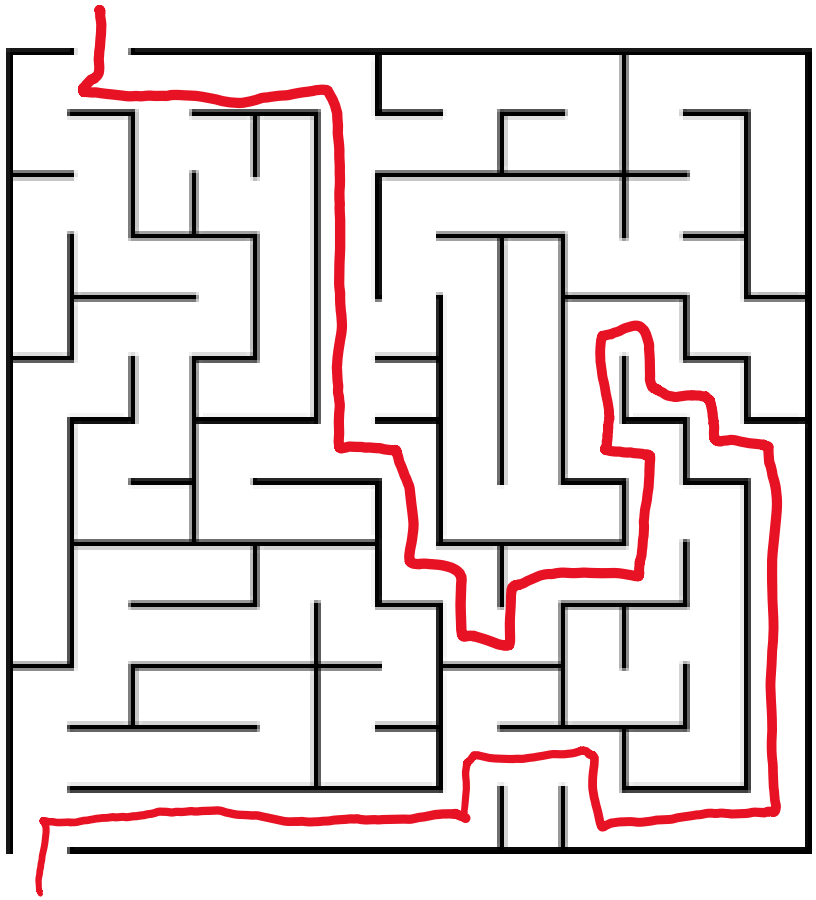
Completely documented?

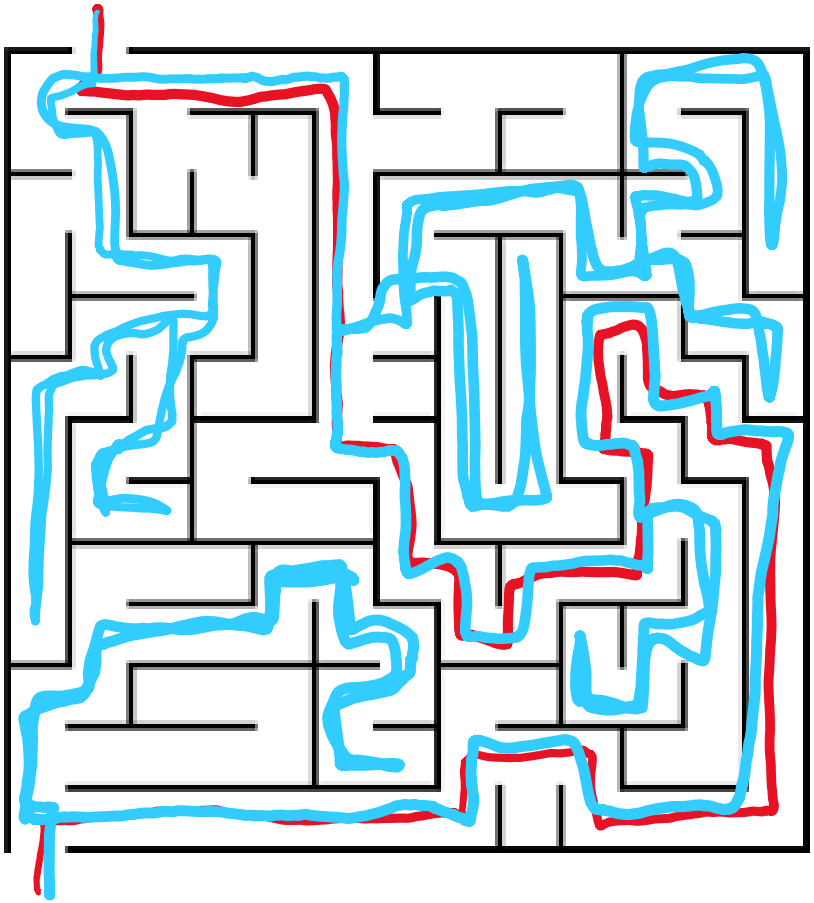
BIOLUMINESCENT SUPER BUGS LAB

How we should science!

Communicate Results

BIOLUMINESCENT SUPER BUGS LAB





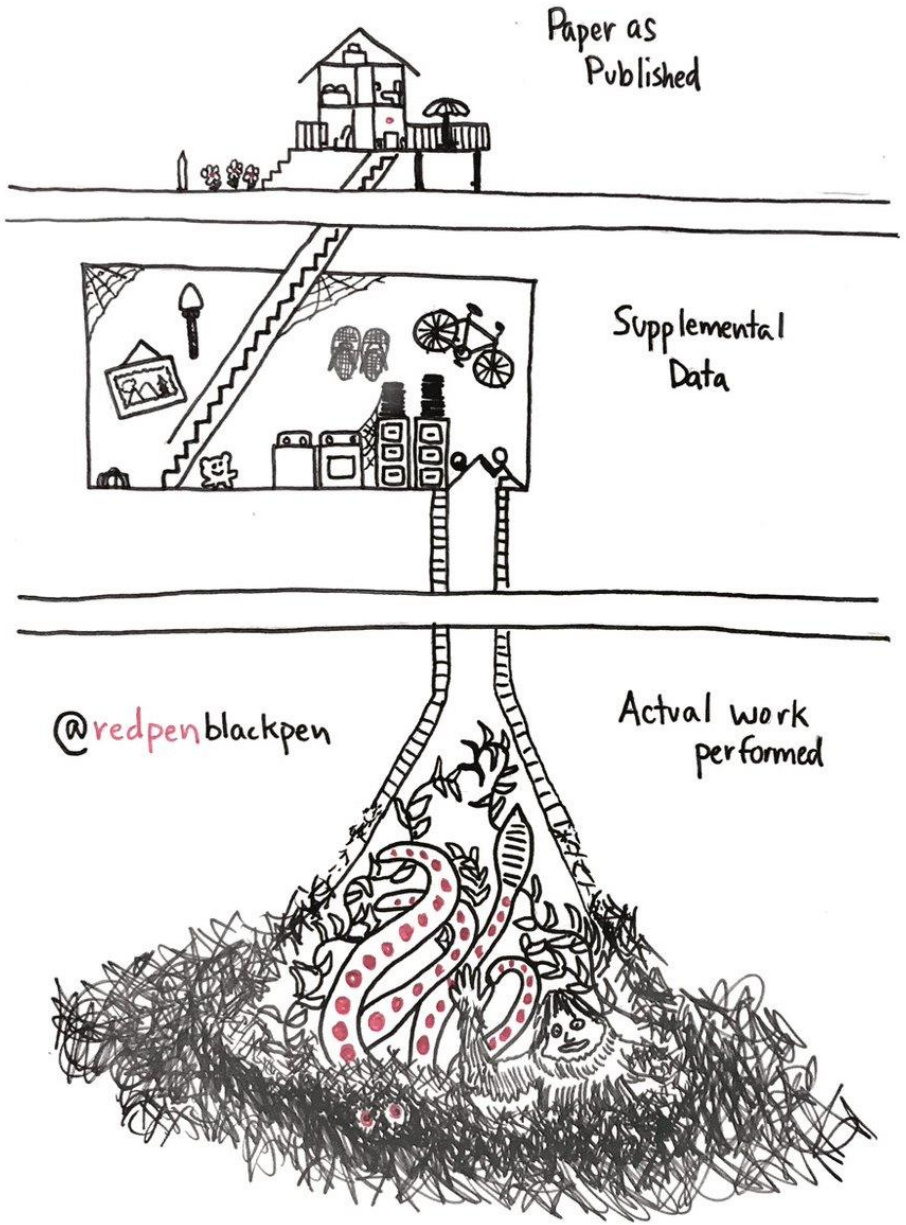


Image credit:
@redpenblackpen

MY ATTEMPTS AT OPEN(ISH) SCIENCE…

BIOLUMINESCENT SUPER BUGS LAB

SEARCH

ENTRIES PROTOCOLS ABOUT LAB BOOK BACK TO SBL

WELCOME!

This is our lab's virtual lab book.

You need to login in order to have access to private content.

See the about page for more information.

RESEARCH

Evolution in Action (27)

HANNAH 2/07/2015

Performed 16/06/2015 – 30/06/2015. A mouse competition experiment competing the ancestral ICC169 strain with the ancestral ICC180, N3, and W5 strains.

As before: 15 mL overnight cultures of ICC169 (3x), ICC180, N3 and W5 were spun down and resuspended in 1.5 mL sterile PBS (resulting in 10x concentrated cultures), and cultures were mixed in a 1:1 ratio as follows: ICC169 with ICC180, ICC169 with N3, and ICC169 with W5. 200 uL of the mixtures were orally gavaged to groups of 6 C57BL/6 mice. For the ICC169/N3 group, the animals received 10 ug/mL nalidixic acid in their drinking water for 1-day prior.

Mice received fresh drugs on Mondays, Wednesdays, and Fridays, and were imaged using an IVIS Kinetic (Caliper LifeScience) machine on Mondays and Fridays. Stools were taken and plated daily to measure relative ratios of the strains shed. At day 6 post-infection, mice were housed in a fresh cage for 1-day. At day 7, mice were re-housed and the 1-day old 'contaminated' cages were used to house naive animals (groups of 6) in order to follow natural transmission of the strains. These animals similarly received antibiotic (in the case of the ICC169/N3 group) in the drinking water and were monitored the same as the original animals.

Raw data: Bacteria shed from mice

			Nal plate (50 ug/mL nalidixic acid)						Km plate (50 ug/mL kanamycin)							
29-Jun	13 Days Post-infection	Mouse	Colonies Counted			Amount plated (uL)	Dilution	CFU/g/stool	Colonies Counted			Amount plated (uL)	Dilution	CFU/g/stool	ICC169	ICC180
		2 1	9	14	9	10	1.00E+01	1.07E+05	5	8	6	10	1.00E+01	6.33E+04	4.33E+04	6.33E+04
		2 2	32	24	19	10	1.00E+00	2.50E+04	22	19	24	10	1.00E+00	2.17E+04	3.33E+03	2.17E+04
		2 3	33	19	35	10	1.00E+03	2.90E+07	17	29	25	10	1.00E+03	2.37E+07	5.33E+06	2.37E+07
		2 4	24	31	27	10	1.00E+00	2.73E+04	20	16	17	10	1.00E+00	1.77E+04	9.67E+03	1.77E+04
		2 5	29	20	21	10	1.00E+00	2.33E+04	22	18	14	10	1.00E+00	1.80E+04	5.33E+03	1.80E+04
		2 6	5	13	9	10	1.00E+01	9.00E+04	8	4	8	10	1.00E+01	6.67E+04	2.33E+04	6.67E+04

			Nal plate (50 ug/mL nalidixic acid)						Km plate (50 ug/mL kanamycin)							
29-Jun	13 Days Post-infection	Mouse	Colonies Counted			Amount plated (uL)	Dilution	CFU/g/stool	Colonies Counted			Amount plated (uL)	Dilution	CFU/g/stool	ICC169	ICC180
		3 1	1	1	0	10	1.00E+00	6.67E+02	0	0	0	10	0.00E+00	0.00E+00	6.67E+02	0.00E+00
		3 2	41	31	36	10	1.00E+02	3.60E+06	17	17	17	10	1.00E+00	1.70E+04	3.58E+06	1.70E+04
		3 3	7	6	4	10	1.00E+00	5.67E+03	0	0	0	10	0.00E+00	0.00E+00	5.67E+03	0.00E+00
		3 4	7	6	7	10	1.00E+00	6.67E+03	0	0	0	10	0.00E+00	0.00E+00	6.67E+03	0.00E+00
		3 5				10		#DIV/0!				10		#DIV/0!	#DIV/0!	#DIV/0!
		3 6	45	42	31	10	1.00E+01	3.93E+05	5	1	1	10	1.00E+00	2.33E+03	3.91E+05	2.33E+03

			Nal plate (50 ug/mL nalidixic acid)						Km plate (50 ug/mL kanamycin)							
30-Jun	14 Days Post-infection	Mouse	Colonies Counted			Amount plated (uL)	Dilution	CFU/g/stool	Colonies Counted			Amount plated (uL)	Dilution	CFU/g/stool	ICC169	ICC180
		1 1	3	1	3	10	1.00E+00	2.33E+03	0	1	3	10	1.00E+00	1.33E+03	1.00E+03	1.33E+03
		1 2	57	52	46	10	1.00E+01	5.17E+05	18	23	26	10	1.00E+00	2.23E+04	4.94E+05	2.23E+04
		1 3	11	11	6	10	1.00E+00	9.33E+03	0	0	0	10	0.00E+00	0.00E+00	9.33E+03	0.00E+00
		1 4	27	14	19	10	1.00E+00	2.00E+04	14	11	12	10	1.00E+00	1.23E+04	7.67E+03	1.23E+04
		1 5	1	1	0	10	1.00E+00	6.67E+02	0	0	0	10	0.00E+00	0.00E+00	6.67E+02	0.00E+00
		1 6	0	0	0	10	0.00E+00	0.00E+00	0	0	0	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00

			Nal plate (50 ug/mL nalidixic acid)						Km plate (50 ug/mL kanamycin)							
30-Jun	14 Days Post-infection	Mouse	Colonies Counted			Amount plated (uL)	Dilution	CFU/g/stool	Colonies Counted			Amount plated (uL)	Dilution	CFU/g/stool	ICC169	ICC180
		2 1	0	0	0	10	0.00E+00	0.00E+00	0	0	0	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		2 2	0	0	0	10	0.00E+00	0.00E+00	0	0	0	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		2 3	12	12	7	10	1.00E+02	1.03E+06	5	13	3	10	1.00E+02	7.00E+05	3.33E+05	7.00E+05
		2 4	0	0	0	10	0.00E+00	0.00E+00	0	0	0	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		2 5	8	11	10	10	1.00E+00	9.67E+03	4	3	1	10	1.00E+00	2.67E+03	7.00E+03	2.67E+03
		2 6	0	0	0	10	0.00E+00	0.00E+00	0	0	0	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00
													0.00E+00			
			Nal plate (50 ug/mL nalidixic acid)						Km plate (50 ug/mL kanamycin)							
30-Jun	14 Days Post-infection	Mouse	Colonies Counted			Amount plated (uL)	Dilution	CFU/g/stool	Colonies Counted			Amount plated (uL)	Dilution	CFU/g/stool	ICC169	ICC180
		3 1	7	5	16	10	1.00E+00	9.33E+03	0	0	0	10	0.00E+00	0.00E+00	9.33E+03	0.00E+00
		3 2	56	68	72	10	1.00E+01	6.53E+05	37	38	46	10	1.00E+00	4.03E+04	6.13E+05	4.03E+04
		3 3	1	2	1	10	1.00E+00	1.33E+03	0	0	0	10	0.00E+00	0.00E+00	1.33E+03	0.00E+00
		3 4	1	1	0	10	1.00E+00	6.67E+02	0	0	0	10	0.00E+00	0.00E+00	6.67E+02	0.00E+00
		3 5				10		#DIV/0!				10		#DIV/0!	#DIV/0!	#DIV/0!
		3 6	7	0	5	10	1.00E+00	4.00E+03	0	0	0	10	0.00E+00	0.00E+00	4.00E+03	0.00E+00

PeerJ

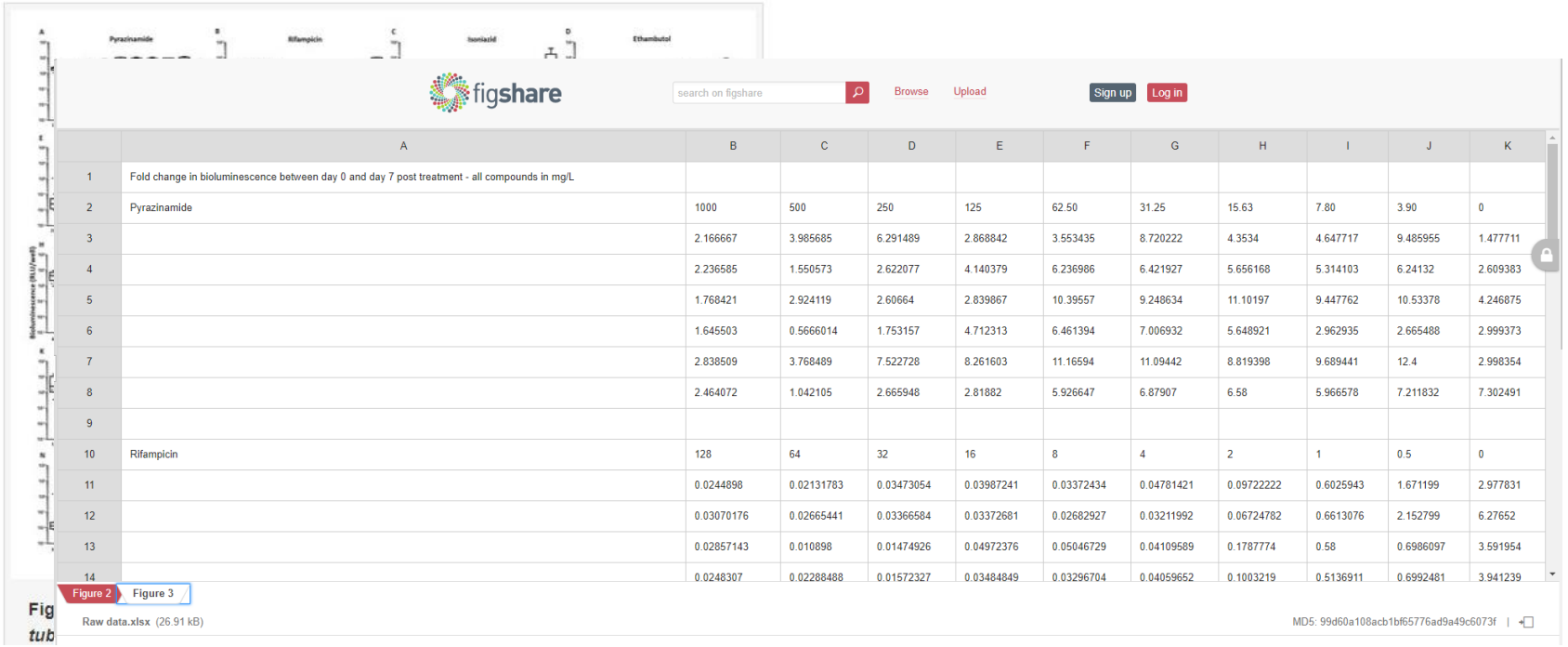
PEER-REVIEWED Microbiology section ›

Effect of common and experimental anti-tuberculosis treatments on *Mycobacterium tuberculosis* growing as biofilms

Related research

Research article | Microbiology | Infectious Diseases

James P. Dalton [1,2,3], Benedict Uy [1,2], Narisa Phummarin [4], Brent R. Copp [3,4], William A. Denny [3,5], Simon Swift [1], Siouxsie Wiles [1,2,3]



	A	B	C	D	E	F	G	H	I	J	K
1	Fold change in bioluminescence between day 0 and day 7 post treatment - all compounds in mg/L										
2	Pyrazinamide	1000	500	250	125	62.50	31.25	15.63	7.80	3.90	0
3		2.166667	3.985685	6.291489	2.868842	3.553435	8.720222	4.3534	4.647717	9.485955	1.477711
4		2.236585	1.550573	2.622077	4.140379	6.236986	6.421927	5.656168	5.314103	6.24132	2.609383
5		1.768421	2.924119	2.60664	2.839867	10.39557	9.248634	11.10197	9.447762	10.53378	4.246875
6		1.645503	0.5666014	1.753157	4.712313	6.461394	7.006932	5.648921	2.962935	2.665488	2.999373
7		2.838509	3.768489	7.522728	8.261603	11.16594	11.09442	8.819398	9.689441	12.4	2.998354
8		2.464072	1.042105	2.665948	2.81882	5.926647	6.87907	6.58	5.966578	7.211832	7.302491
9											
10	Rifampicin	128	64	32	16	8	4	2	1	0.5	0
11		0.0244898	0.02131783	0.03473054	0.03987241	0.03372434	0.04781421	0.09722222	0.6025943	1.671199	2.977831
12		0.03070176	0.02665441	0.03366584	0.03372681	0.02682927	0.03211992	0.06724782	0.6613076	2.152799	6.27652
13		0.02857143	0.010898	0.01474926	0.04972376	0.05046729	0.04109589	0.1787774	0.58	0.6986097	3.591954
14		0.0248307	0.02288488	0.01572327	0.03484849	0.03296704	0.04059652	0.1003219	0.5136911	0.6992481	3.941239

Figure 2 | Figure 3

Raw data.xlsx (26.91 kB)

MD5: 99d60a108acb1bf65776ad9a49c6073f

LESSONS LEARNED…

Open Access is not open science/research…..

Need to really think about how we document our entire research workflow (warts and all…)

If I was hit by a car tomorrow would anyone else be able to make sense of that documentation?

Raw data vs tidy data…

Image credit:
Gravity Falls (https://disneynow.go.com/shows/gravity-falls)

Image credit:
https://www.deviantart.com/alicornofmagic/art/Collab-My-Very-Best-Friends-370402852

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YouTube www.youtube.com/user/Skeptimoo

Sciblogs www.sciblogs.co.nz/infectious-thoughts/