

**MICROGEN DX
THE WAY FORWARD IN
CHRONIC UTI
MANAGEMENT AND
PROSTATITIS**

Beverley Sarstedt

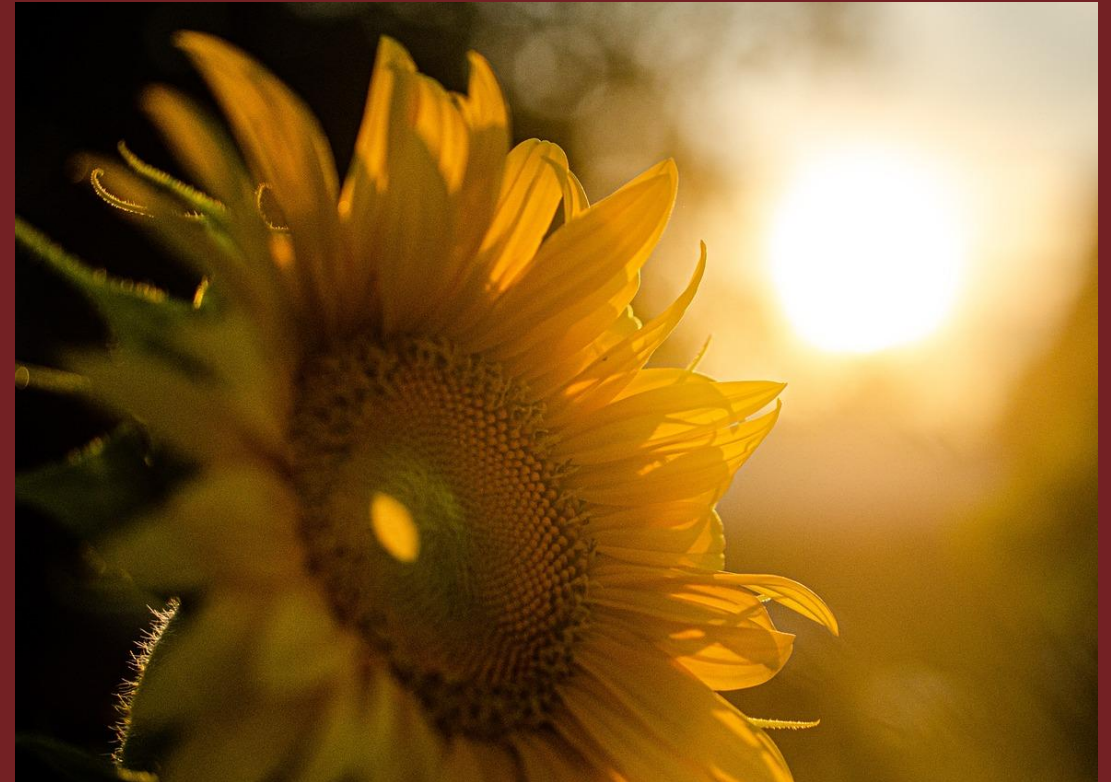
OVERVIEW

- Getting the basics right
- The relevance of biofilms
- The difference between PCR and NGS
- Case histories
- Final thoughts



VITAMIN D AND PREVENTION

- Ruth tested the genetics of 155 patients and found that 100% had a Vitamin D receptor VDR mutation
- Vitamin D needed to be optimal in order for an antimicrobial peptide called cathelicidin to be produced in response to an infection.
- Test and optimise vitamin D
- [Vitamin D Induction of the Human Antimicrobial Peptide Cathelicidin in the Urinary Bladder | PLOS ONE](#)





CBS MUTATION

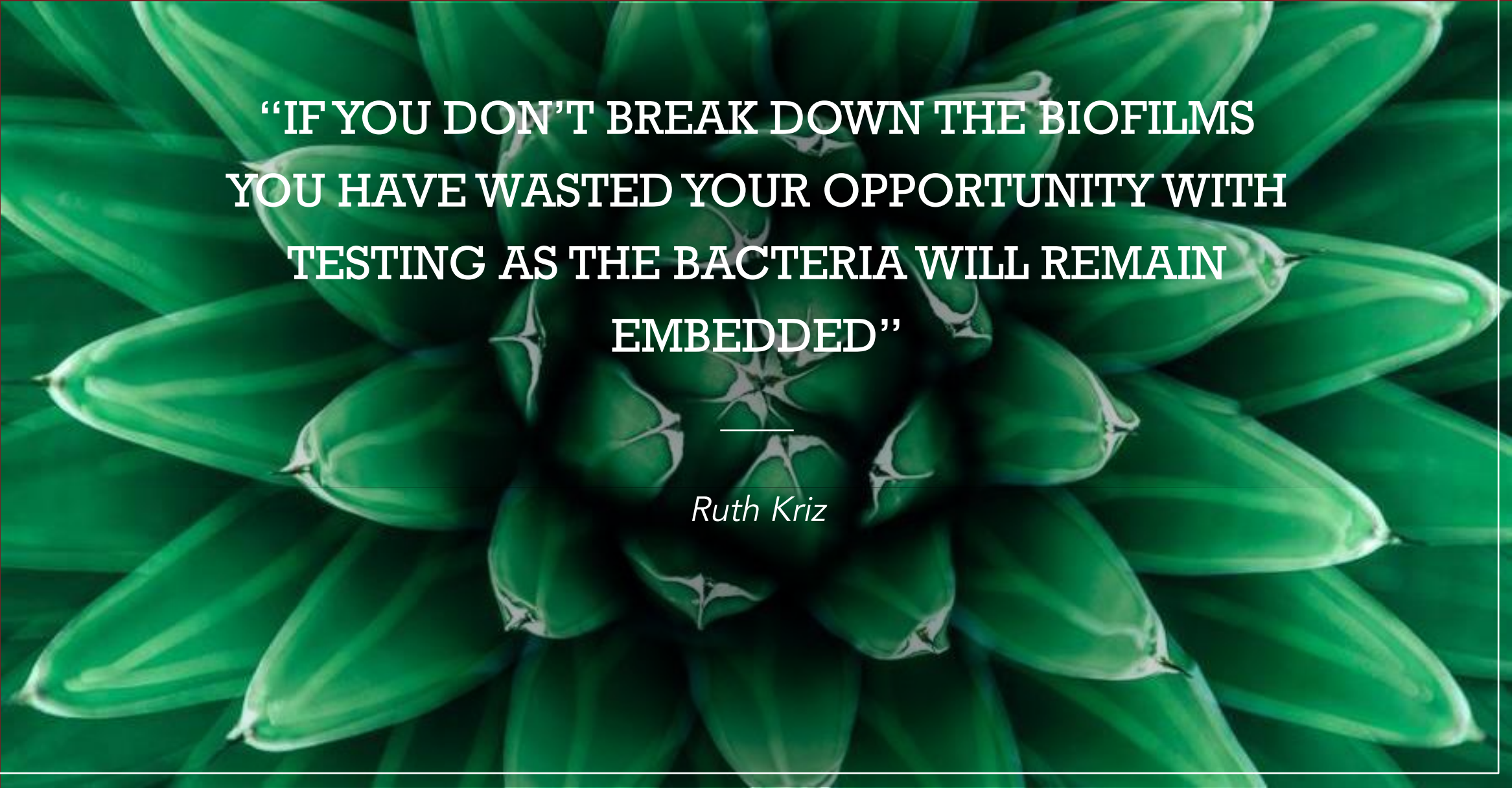
Of the 155 whose genetics were tested 100% had a CBS mutation which means they produce too much ammonia.

This damages the bladder wall and prevents healing and also creates a breeding ground for pathogens which thrive in a high urine pH environment

Urine pH needs to be measured first thing in the morning and to keep it between 5.75 and 6.0 patients need to dose L Ornithine HCL each night 1 capsule at a time until the morning urine pH comes down.

TIP#1

- Ask patients to send you their first week of urine pH test results so that you can support their titration with L-ornithine HCL. This ensures that this is carried out optimally.

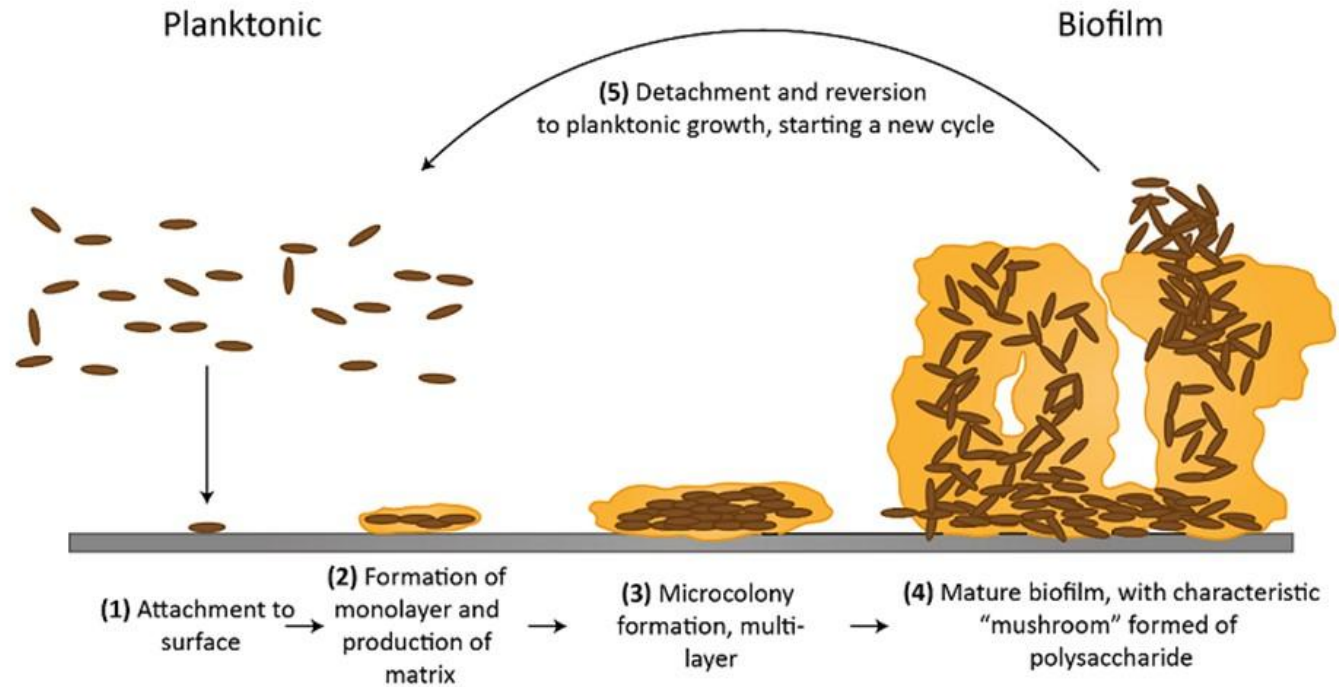


**“IF YOU DON’T BREAK DOWN THE BIOFILMS
YOU HAVE WASTED YOUR OPPORTUNITY WITH
TESTING AS THE BACTERIA WILL REMAIN
EMBEDDED”**

Ruth Kriz

The Chronic UTI Patient has a Chronic Infection

<https://www.immunology.org/public-information/bitesized-immunology/pathogens-disease/biofilms-and-their-role-pathogenesis>



1. Bacteria are free floating – planktonic
2. Bacteria produce amyloid fibers that attach to the surface
3. Biofilm matures – polysaccharide, eDNA, fibrin, or amyloid types
4. Detachment and reversion to planktonic dispersal of pathogens

BIOFILM DISRUPTORS

Kirkman biofilm defense

- Start with this one for a gentler release of bacteria
- Dose as 1 daily with or without food
- Serrapeptase, Nattokinase, Peptidase (DPPIV)
- Dissolves the sugar and fibrin components of most unhealthy biofilms
- .

Lumbrokinase (Boluoke)

- Start with boluoke when there are confirmed or suspected genetics around hypercoagulation.
- Boluoke is the only fully researched oral enzyme on the market supporting a healthy coagulation/fibrinolysis balance
- Dose as 1 capsule on an empty stomach followed by a glass of water and increase to 2 caps if tolerated.
- Out of 155 Ruth's patient sample nearly 70% had genetic risks which lead to too much fibrin production
- PAI-1 4g, Leiden factor II and V and lipo (a)
- Boluoke is also selected when there are multiple resistance genes detected on a microgen report as this indicates a major biofilm issue.
- [Boluoke® Lumbrokinase 120 caps - Researched Nutritionals](#)

EXTRACELLULAR DNA BIOFILMS

Priority One Phase 2 advanced

- This is used when there are bacteria found which produce their own extracellular DNA biofilms , Contains bismuth, ALA and Black Cumin.
- Take 2 caps daily on an empty stomach followed by a glass of water.

Pathogens producing EX DNA biofilms

- Klebsiella
- Pseudomonas
- Enterobacter
- .

TIP #2

- Order the Microgen kit and biofilm disruptors at the same time but do not start biofilm disruptors until the Microgen kit has arrived. This ensures you are ready to test as soon as bacteria is released in case symptoms escalate.
- Microgen testing can be done 5-7 days after biofilm disruptor or sooner if symptomatic.

LEVEL 1 PCR

RESISTANCE GENES DETECTED		ANTIMICROBIALS FOR CONSIDERATION																
Tetracycline tetM, Quinolone qnr		Gram Stain	Respiration	Metronidazole (Flagyl)	Ampicillin/Amoxicillin	Extended spectrum penicillins/Beta-lactamase inhibitors e.g. Augmentin	Fosfomycin	Nitrofurantoin e.g. Macrobid	Aminoglycosides e.g. Amikacin	Anti-folates e.g. Bactrim	Carbapenems e.g. Merrem	Cephalosporins Third Gen e.g. Suprax	Aminoglycosides+Aminopenicillins e.g. Ampicillin/Gentamicin	Glycopeptides e.g. Vancomycin	Linezolid (Zyvox)	Lipopeptides e.g. Cubicin	Penicillins e.g. Penicillin	Fluoroquinolones e.g. Levofloxacin
LEVEL 1 PCR REPORT																		
THIS IS A PRELIMINARY REPORT . NEXT GENERATION SEQUENCING RESULTS ARE PENDING. THE REPORT WILL BE AVAILABLE TYPICALLY IN 3-5 BUSINESS DAYS.																		
RAPID SCREENING (PCR RESULTS)		DNA copies per mL																
BACTERIAL LOAD	High	> 10 ⁷																
Prevotella bivia	2.70 x 10 ⁴	-	An	√														
Escherichia coli	6.39 x 10 ⁶	-	FAn	√	√	√	√	√	√	√	√							
Enterococcus faecalis	1.88 x 10 ⁴	+	FAn	√	√	√	√					√	√	√	√	√		
FUNGI DETECTED																		
None																		

LAB REPORT KEY

LEVEL 2 NGS

RESISTANCE GENES DETECTED																					
Tetracycline tetM, Quinolone qnr																					
LEVEL 2 NGS REPORT				ANTIMICROBIALS FOR CONSIDERATION																	
COMPREHENSIVE IDENTIFICATION NEXT-GEN DNA SEQUENCING RESULTS with PRIOR PCR RESULTS.				Gram Stain	Respiration	Aminoglycosides e.g. Amikacin	Antifolates e.g. Bactrim	Carbapenems e.g. Merrem	Ampicillin/Amoxicillin	Extended spectrum penicillins/Beta-lactamase inhibitors e.g. Augmentin	Fosfomycin	Nitrofurantoin e.g. Macrobid	Cephalosporins Third Gen e.g. Sultrax	Anti-Pseudomonal penicillins/Beta-lactamase inhibitors e.g. Zosyn	Aztreonam	Cephalosporins Fourth Gen e.g. Maxipime	Colistin	Metronidazole (Flagyl)	Aminoglycosides Aminoglycosyllins e.g. Ampicillin/Gentamicin	Glycopeptides e.g. Vancomycin	
COMPLETE (NGS & PCR RESULTS)			DNA copies per mL	NGS	IV	PO	PO	PO	PO	PO	PO		IV	PO	IV	IV					
BACTERIAL LOAD	High	> 10 ⁷	%																		
Escherichia coli	50%	6.39 x 10 ⁶		-	FAn	√	√	√	√	√	√	√									
Enterobacter asburiae	49%	NGS		-	FAn	√	√	√	√	√	√	√	√	√	√	√	√				
Prevotella bivia		2.70 x 10 ⁶		-	An																
Enterococcus faecalis		1.88 x 10 ⁴		+	FAn			√	√	√	√								√	√	
FUNGI DETECTED				%	ANTIFUNGALS FOR CONSIDERATION																
None																					

LAB REPORT KEY

SUMMARY

Prescribing decisions based on level 2 as more information is provided which is clinically relevant.

After the first Microgen lumbrokinase might be started if there are a high amount of resistance genes.

A further biofilm disruptor may be added if the bacteria present make their own ex DNA biofilms.



MRS J

UTI since childhood but recurrent since 2016

Covid in 2022 after which UTI symptoms have become more chronic

Underactive thyroid 2005

Chronic constipation

Anxiety throughout life

Migraine 2020

Adverse reactions to: penicillin, trimethoprim, nitrofurantoin.

FIRST FOLLOW UP BEFORE MICROGEN

- Initial recommendations: Elimination diet, magnesium citrate, omega 3, vit D, probiotics. Lumbrokinase started as covid had triggered more chronic symptoms.
- Many symptoms have improved
- Bowel function, going daily number 3/4
- Sleep is better :
- Anxiety significantly reduced
- Migraine aura has also gone.
- Bladder/pelvic pain the best it had been in a long time.
- Cyst on finger has also disappeared. The enzymes in lumbrokinase can help to dissolve non-living tissue in the body such as cysts, swellings, plaque and scar tissue.

MRS J URINE LEVEL 2 MARCH 23

RESISTANCE GENES DETECTED																				
Quinolone qnr																				
LEVEL 2 NGS REPORT			ANTIMICROBIALS FOR CONSIDERATION																	
			Gram Stain	Respiration																
COMPREHENSIVE IDENTIFICATION NEXT-GEN DNA SEQUENCING RESULTS with PRIOR PCR RESULTS.				Aminoglycosides e.g. Amikacin	Antifolates e.g. Bactrim	Carbapenems e.g. Merrem	Fosfomycin	Ampicillin/Amoxicillin	Cephalosporins Third Gen e.g. Suprax	Extended spectrum penicillins/Beta-lactamase inhibitors e.g. Augmentin	Nitrofurantoin e.g. Macrobid	Anti-Pseudomonal penicillins/Beta-lactamase inhibitors e.g. Zosyn	Aztreonam	Cephalosporins Fourth Gen e.g. Maxipime	Colistin	Fluoroquinolones e.g. Levofloxacin				
COMPLETE (NGS & PCR RESULTS)	DNA copies per mL	NGS %		IV	PO	PO	PO	PO	PO	PO	PO			IV		PO				
BACTERIAL LOAD	High	> 10 ⁷																		
Escherichia coli	1.67 x 10 ⁶	85%	- FAn	√	√	√	√	√	√	√	√									
Enterobacter hormaechei	NGS	13%	- FAn	√	√	√	√					√	√	√	√					
FUNGI DETECTED			%	ANTIFUNGALS FOR CONSIDERATION																
None																				

MRS J LEVEL 2 VAGINAL MARCH 23

RESISTANCE GENES DETECTED				ANTIMICROBIALS FOR CONSIDERATION														
Tetracycline tetM, Bactrim sul I																		
LEVEL 2 NGS REPORT			Gram Stain	Respiration	ANTIMICROBIALS FOR CONSIDERATION													
COMPREHENSIVE IDENTIFICATION NEXT-GEN DNA SEQUENCING RESULTS with PRIOR PCR RESULTS.					Aminoglycosides e.g. Amikacin	Clindamycin	Penicillins e.g. Penicillin	Carbapenems e.g. Merrem	Extended spectrum penicillins/Beta-lactamase inhibitors e.g. Augmentin	Colistin	Cephalosporins Fourth Gen e.g. Plazomicin	Fluoroquinolones e.g. Levofloxacin	Fosfomycin	Ampicillin/Amoxicillin	Cephalosporins Third Gen e.g. Suprax	Nitrofurantoin e.g. Macrobid	Anti-Pseudomonal Penicillins e.g. Merrem	Anti-Pseudomonal penicillins/Beta-lactamase inhibitors e.g. Zosyn
COMPLETE (NGS & PCR RESULTS)	DNA copies (NIA)	NGS		IV	PO	PO	PO	PO	IV	PO	PO	PO	PO	PO	IV	PO		
BACTERIAL LOAD	Med	%																
Lactobacillus crispatus	NGS	43%	+ FAn	√	√	√												
Acinetobacter haemolyticus	NGS	13%	- Ae	√		√	√	√	√									
Escherichia coli	NGS	9%	- FAn	√		√	√	√	√			√	√	√				
Pseudomonas moorei	NGS	8%	- Ae	√		√	√	√	√			√	√	√	√	√		
Lactobacillus iners	NGS	7%	+ FAn	√	√	√	√	√				√						
Pseudomonas putida	NGS	6%	- Ae	√		√	√	√	√			√	√	√	√	√		
Acinetobacter johnsonii	NGS	2%	- Ae			√	√	√	√									
Prevotella timonensis	NGS	2%	- An													√		
Prevotella bivia	Medium		- An							√						√		
Lactobacillus crispatus/acidophilus	Medium		+ An	√	√	√	√					√			√			
Ureaplasma parvum	Low		U Unk							√								
FUNGI DETECTED		%																
None																		

KEY POINTS MARCH 23

- Check resistance genes to make Rx decisions
- Be aware of adverse reactions (always check these as clients don't always remember to tell us)
- Fosfomycin was Rx and Ruth doses every other day for 3 sachets to avoid GI issues. Saccharomyces Boulardii is always given with Fosfomycin to prevent C.Diff
- Restart D mannose since E.Coli is present.
- Enterobacter was at 13% so as this makes its own biofilm we need to add Phase 2 Advanced with bismuth in addition to lumbrokinase. 2 caps on an empty stomach followed by a glass of water. This is taken at the opposite end of the day to lumbrokinase so that both can be done on empty stomach.
- Continue reducing urine pH to make the environment less hospitable to Enterobacter.
- Vaginal health: medium load of lactobacillus is what we are aiming for. 50% load and some small numbers of various pathogens. Focus on ACV douching twice weekly for 4 weeks to inhibit these.

MRS J VAGINAL MAY 23

RESISTANCE GENES DETECTED				ANTIMICROBIALS FOR CONSIDERATION																																				
None																																								
<p style="text-align: center;">LEVEL 2 NGS REPORT</p> <p style="text-align: center;">COMPREHENSIVE IDENTIFICATION NEXT-GEN DNA SEQUENCING RESULTS with PRIOR PCR RESULTS.</p>				Gram Stain	Respiration	Aminoglycosides e.g. Amikacin	Clindamycin	Penicillins e.g. Penicillin	Ampicillin/Amoxicillin	Extended spectrum penicillins/Beta-lactamase inhibitors e.g. Augmentin	Fluoroquinolones e.g. Levofloxacin	Metronidazole (Flagyl)	Macrolides e.g. Erythromycin	Anti-Pseudomonal Penicillins e.g. Mezlin	Linezolid (Zyvox)	Tetracyclines e.g. Doxycycline																								
				COMPLETE (NGS & PCR RESULTS)	DNA copies (N/A)	NGS %	IV	PO	PO	PO	PO	PO	PO	PO	IV	PO	PO																							
BACTERIAL LOAD	Med																																							
Lactobacillus iners	NGS	50%	+	FAn	√	√	√	√	√																															
Lactobacillus crispatus	NGS	44%	+	FAn	√	√	√																																	
Prevotella bivia	Low		-	An						√	√																													
Lactobacillus crispatus/acidophilus	Medium		+	An	√	√	√	√	√			√	√	√																										
Ureaplasma parvum	Low		U	Unk						√	√			√																										
FUNGI DETECTED																																								
None																																								

MRS J URINE MAY 23

RESISTANCE GENES DETECTED																	
None																	
LEVEL 2 NGS REPORT		ANTIMICROBIALS FOR CONSIDERATION															
		Comprehensive Identification NEXT-GEN DNA SEQUENCING RESULTS with PRIOR PCR RESULTS.															
COMPLETE (NGS & PCR RESULTS)		DNA copies per mL	NGS %	Gram Stain	Respiration	Penicillins e.g. Penicillin	Aminoglycosides e.g. Amikacin	Clindamycin	Ampicillin/Amoxicillin	Extended spectrum penicillins/Beta-lactamase inhibitors e.g. Augmentin	Fluoroquinolones e.g. Levofloxacin	Aminoglycosides-Aminopenicillins e.g. Ampicillin/Gentamicin	Fosfomycin	Glycopeptides e.g. Vancomycin	Linezolid (Zyvox)	Macrolides e.g. Erythromycin	Tetracyclines e.g. Doxycycline
BACTERIAL LOAD	Low	< 10 ⁶	%	Gram Stain	Respiration	PO	IV	PO	PO	PO	PO	IV	PO	IV	PO	PO	PO
Lactobacillus crispatus		NGS	36%	+	FAn	√	√	√									
Enterococcus casseliflavus		NGS	30%	+	FAn	√		√	√	√	√	√	√	√	√		
Lactobacillus iners		NGS	27%	+	FAn	√	√	√	√	√	√	√	√	√	√		
Ureaplasma parvum		NGS	3%	U	Unk						√					√	√
FUNGI DETECTED			%	ANTIFUNGALS FOR CONSIDERATION													
None																	

KEY POINTS MAY 23

- Mrs J now asymptomatic
- Urine: reduced from a high to a low load
- E.Coli eradicated 100%
- Good load of lactobacillus now present
- Enterococcus Cassieflavus 30%. Management: Reduce urine pH
- Vaginal: Very good picture with medium load lactobacillus total 94%.
- Phase 2 advanced was stopped as Enterobacter had cleared.

MRS J URINE AUGUST 23

RESISTANCE GENES DETECTED																		
None																		
<p>LEVEL 2 NGS REPORT</p> <p>COMPREHENSIVE IDENTIFICATION NEXT-GEN DNA SEQUENCING RESULTS with PRIOR PCR RESULTS.</p>		ANTIMICROBIALS FOR CONSIDERATION																
		Gram Stain	Respiration	Fluoroquinolones e.g. Levofloxacin	Anti-Pseudomonal Penicillins e.g. Merzlin	Carbapenems e.g. Merrem	Aminoglycosides e.g. Amikacin	Anti-Pseudomonal penicillins/Beta-lactamase inhibitors e.g. Zosyn	Colistin	Fosfomycin	Nitrofurantoin e.g. Macrobid	Ampicillin/Amoxicillin	Extended spectrum penicillins/Beta-lactamase inhibitors e.g. Augmentin	Glycopeptides e.g. Vancomycin	Tetracyclines e.g. Doxycycline	Antifolates e.g. Bactrim	Cephalosporins First Gen e.g. Relfex	Clindamycin
COMPLETE (NGS & PCR RESULTS)		DNA copies per mL	NGS	Gram Stain	Respiration	PO	IV	IV	IV	PO	PO	PO	PO	IV	PO	PO	PO	PO
BACTERIAL LOAD		High	> 10 ⁷	%														
Pseudomonas chlororaphis	NGS	54%	-	Ae	√	√	√	√	√	√								
Aerococcus urinae	NGS	21%	+	Ae	√					√	√							
Staphylococcus saprophyticus	NGS	10%	+	FAn	√	√				√		√	√	√	√	√	√	√
Actinotignum schaalii	NGS	6%	+	FAn								√						
Streptococcus mitis	NGS	3%	+	FAn	√		√					√	√	√				
FUNGI DETECTED				%	ANTIFUNGALS FOR CONSIDERATION													
None																		

MRS J VAGINAL AUG 23

RESISTANCE GENES DETECTED																		
None																		
<p style="text-align: center;">LEVEL 2 NGS REPORT</p> <p style="text-align: center;">COMPREHENSIVE IDENTIFICATION NEXT-GEN DNA SEQUENCING RESULTS with PRIOR PCR RESULTS.</p>		ANTIMICROBIALS FOR CONSIDERATION																
		Gram Stain	Respiration	Clindamycin	Aminoglycosides e.g. Amikacin	Penicillins e.g. Penicillin	Extended spectrum penicillins/Beta-lactamase inhibitors e.g. Amoxicillin	Ampicillin/Amoxicillin	Anti-Pseudomonal Penicillins e.g. Mezlin	Linezolid (Zyvox)	Cephalosporins First Gen e.g. Keflex	Glycopeptides e.g. Vancomycin	Lipopeptides e.g. Colistin	Fluoroquinolones e.g. Levofloxacin	Metronidazole (Flagyl)	Macrolides e.g. Erythromycin	Tetracyclines e.g. Doxycycline	
COMPLETE (NGS & PCR RESULTS)	DNA copies (N/A)	NGS	Gram Stain	Respiration	Clindamycin	Aminoglycosides e.g. Amikacin	Penicillins e.g. Penicillin	Extended spectrum penicillins/Beta-lactamase inhibitors e.g. Amoxicillin	Ampicillin/Amoxicillin	Anti-Pseudomonal Penicillins e.g. Mezlin	Linezolid (Zyvox)	Cephalosporins First Gen e.g. Keflex	Glycopeptides e.g. Vancomycin	Lipopeptides e.g. Colistin	Fluoroquinolones e.g. Levofloxacin	Metronidazole (Flagyl)	Macrolides e.g. Erythromycin	Tetracyclines e.g. Doxycycline
BACTERIAL LOAD	Med	%			PO	IV	PO	PO	PO	IV	PO	PO	IV	IV	PO	PO	PO	PO
Lactobacillus iners	NGS	70%	+	FAn	√	√	√	√	√									
Lactobacillus crispatus	NGS	20%	+	FAn	√	√	√											
Staphylococcus epidermidis	NGS	2%	+	FAn	√			√		√	√	√	√					
Prevotella bivia	Low		-	An											√	√		
Lactobacillus crispatus/acidophilus	Medium		+	An	√	√	√	√	√	√							√	√
Ureaplasma parvum	Low		U	Unk											√		√	√
FUNGI DETECTED		%	ANTIFUNGALS FOR CONSIDERATION															
Exophiala dermatitidis		77%	N															
Malassezia globosa		18%	N	Unk														
Alternaria alternata		2%	N	Unk														

KEY POINTS AUGUST 23

- High load of uropathogens and now symptomatic
- Dominant pathogen pseudomonas 54% which likes a high pH. Rx levofloxacin 2 weeks. Dose magnesium to bowel tolerance to avoid tendonitis. Take minerals at a different time from levofloxacin as they can decrease absorption as can dairy.
- Pseudomonas makes its own biofilm so phase 2 advanced with bismuth was restarted
- Vaginal: Better lactobacillus which can often crowd out yeast. Query whether to treat. Mild symptoms. As 3 fungi present fluconazole was given for 2 weeks. Restart ACV douching.

MRS J NOVEMBER 23 URINE

RESISTANCE GENES DETECTED																					
None																					
LEVEL 2 NGS REPORT			ANTIMICROBIALS FOR CONSIDERATION																		
COMPREHENSIVE IDENTIFICATION NEXT-GEN DNA SEQUENCING RESULTS with PRIOR PCR RESULTS.			Gram Stain	Respiration	Clindamycin	Aminoglycosides e.g. Amikacin	Penicillins e.g. Penicillin	Extended spectrum penicillins/Beta-lactamase inhibitors e.g. Augmentin	Ampicillin/Amoxicillin	Glycopeptides e.g. Vancomycin	Metronidazole (Flagyl)	Antifolates e.g. Bactrim	Linezolid (Zyvox)	Lipopeptides e.g. Colistin	Anti-Pseudomonal Penicillins e.g. Mezlin	Cephalosporins First Gen e.g. Keflex	Fluoroquinolones e.g. Levofloxacin	Nitrofurantoin e.g. Macrobid	Tetracyclines e.g. Doxycycline		
COMPLETE (NGS & PCR RESULTS)		DNA copies per mL	NGS	Gram Stain	Respiration	Clindamycin	Aminoglycosides e.g. Amikacin	Penicillins e.g. Penicillin	Extended spectrum penicillins/Beta-lactamase inhibitors e.g. Augmentin	Ampicillin/Amoxicillin	Glycopeptides e.g. Vancomycin	Metronidazole (Flagyl)	Antifolates e.g. Bactrim	Linezolid (Zyvox)	Lipopeptides e.g. Colistin	Anti-Pseudomonal Penicillins e.g. Mezlin	Cephalosporins First Gen e.g. Keflex	Fluoroquinolones e.g. Levofloxacin	Nitrofurantoin e.g. Macrobid	Tetracyclines e.g. Doxycycline	
BACTERIAL LOAD	Low	< 10 ⁵	%	Gram Stain	Respiration	Clindamycin	Aminoglycosides e.g. Amikacin	Penicillins e.g. Penicillin	Extended spectrum penicillins/Beta-lactamase inhibitors e.g. Augmentin	Ampicillin/Amoxicillin	Glycopeptides e.g. Vancomycin	Metronidazole (Flagyl)	Antifolates e.g. Bactrim	Linezolid (Zyvox)	Lipopeptides e.g. Colistin	Anti-Pseudomonal Penicillins e.g. Mezlin	Cephalosporins First Gen e.g. Keflex	Fluoroquinolones e.g. Levofloxacin	Nitrofurantoin e.g. Macrobid	Tetracyclines e.g. Doxycycline	
Lactobacillus crispatus	NGS	35%	+ FAn	√	√	√															
Lactobacillus iners	NGS	31%	+ FAn	√	√	√	√	√	√												
Staphylococcus xylosum	NGS	16%	+ FAn	√	√	√	√	√	√	√	√	√	√	√							
Staphylococcus saprophyticus	NGS	8%	+ FAn	√		√	√	√	√	√	√	√	√		√	√	√	√	√	√	√
Fingoldia magna	NGS	2%	+ An	√		√	√	√	√	√	√	√									
FUNGI DETECTED			%	ANTIFUNGALS FOR CONSIDERATION																	
None																					

MRS J NOVEMBER 23 VAGINAL

RESISTANCE GENES DETECTED																				
None																				
LEVEL 2 NGS REPORT			ANTIMICROBIALS FOR CONSIDERATION																	
			Gram Stain	Respiration	Aminoglycosides e.g. Amikacin	Clindamycin	Penicillins e.g. Penicillin	Ampicillin/Amoxicillin	Extended spectrum penicillins/Beta-lactamase inhibitors e.g. Augmentin	Fluoroquinolones e.g. Levofloxacin	Metronidazole (Flagyl)	Anti-Pseudomonal Penicillins e.g. Mezlin	Linezolid (Zyvox)	Macrolides e.g. Erythromycin						
COMPLETE (NGS & PCR RESULTS)	DNA copies (N/A)	NGS %																		
BACTERIAL LOAD			Med																	
Lactobacillus iners	NGS	68%	+	FAn	√	√	√	√	√											
Lactobacillus crispatus	NGS	28%	+	FAn	√	√	√													
Prevotella bivia	Low		-	An					√	√										
Lactobacillus crispatus/acidophilus	Medium		+	An	√	√	√	√	√		√	√	√							
FUNGI DETECTED			%	ANTIFUNGALS FOR CONSIDERATION																
None																				

KEY POINTS NOV 23

- Urine : much better. Low load. Total lactobacillus 66% Asymptomatic
- Stop phase 2 advanced as no longer needed.
- Continue urine pH testing and titrate ornithine as needed.
- Vaginal: Medium load of lactobacillus at 96%. Continue probiotics and occasional testing of vaginal pH to ensure it's kept more acidic between 2.8 and 4.0 for prevention. ACV douching can be done twice weekly as needed.
- Vaginal oestrogen added. Sea buckthorn added.

MRS J FEBRUARY 24 URINE

RESISTANCE GENES DETECTED																						
Tetracycline tetB																						
LEVEL 2 NGS REPORT		ANTIMICROBIALS FOR CONSIDERATION																				
COMPREHENSIVE IDENTIFICATION NEXT-GEN DNA SEQUENCING RESULTS with PRIOR PCR RESULTS.				Gram Stain	Respiration	Aminoglycosides e.g. Amikacin	Clindamycin	Penicillins e.g. Penicillin	Ampicillin/Amoxicillin	Extended spectrum penicillins/Beta-lactamase inhibitors e.g. Augmentin	Antifolates e.g. Bactrim	Carbapenems e.g. Merrem	Cephalosporins Third Gen e.g. Suprax	Fluoroquinolones e.g. Levofloxacin	Fosfomycin	Nitrofurantoin e.g. Macrobid						
COMPLETE (NGS & PCR RESULTS)	DNA copies per mL	NGS		IV	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO							
BACTERIAL LOAD	Medium	10 ⁶ -10 ⁷	%																			
Lactobacillus crispatus	NGS	68%	+	FAn	√	√	√	√	√	√	√	√	√	√	√							
Escherichia coli	3.44 x 10 ⁶	26%	-	FAn	√	√	√	√	√	√	√	√	√	√	√							
Lactobacillus iners	NGS	3%	+	FAn	√	√	√	√	√	√	√	√	√	√	√							
FUNGI DETECTED			%	ANTIFUNGALS FOR CONSIDERATION																		
None																						

MRS J FEB 24 KEY POINTS

- Medium load of bacteria, lactobacillus total 71%
- E.Coli at 26% (As only a medium load and a small % the decision was made to start with a botanical antimicrobial with the option of an antibiotic if required)
- Symptoms mild pain and frequency.
- Uva Ursi for 2 weeks and D mannose. Took until day 13 of Uva ursi to clear infections so no antibx were required.
- Vaginal health not tested but symptoms good and pH testing continued. ACV occasional.

MRS J URINE MAY 24

RESISTANCE GENES DETECTED																								
None																								
LEVEL 2 NGS REPORT			ANTIMICROBIALS FOR CONSIDERATION																					
COMPREHENSIVE IDENTIFICATION NEXT-GEN DNA SEQUENCING RESULTS with PRIOR PCR RESULTS.			Gram Stain	Respiration	Clindamycin	Aminoglycosides e.g. Amikacin	Penicillins e.g. Penicillin	Extended spectrum penicillins/Beta-lactamase inhibitors e.g. Augmentin	Ampicillin/Amoxicillin	Glycopeptides e.g. Vancomycin	Linezolid (Zyvox)	Lipopeptides e.g. Colistin	Tetracyclines e.g. Doxycycline	Anti-Pseudomonal Penicillins e.g. Meropenem	Cephalosporins First Gen e.g. Ceftriaxone	Keflex								
COMPLETE (NGS & PCR RESULTS)	DNA copies per mL	NGS																						
BACTERIAL LOAD	Low	< 10 ⁸	%	PO	IV	PO	PO	PO	IV	PO	IV	PO	IV	PO	IV	PO								
Lactobacillus iners	NGS	52%	+ FAn	√	√	√	√	√																
Lactobacillus crispatus	NGS	29%	+ FAn	√	√	√																		
Corynebacterium renale	NGS	10%	+ FAn						√	√	√	√												
Staphylococcus epidermidis	NGS	5%	+ FAn	√			√		√	√	√		√	√										
FUNGI DETECTED			%	ANTIFUNGALS FOR CONSIDERATION																				
None																								

KEY POINTS MRS J MAY 24

- Urine : low load of lactobacillus . Continues to be asymptomatic which is good news.
- Continue D mannose, vit D, probiotics, omega 3, mag citrate, sea buckthorn and ornithine as per urine pH testing. Continue vag pH testing and ACV as needed.
- Restarted vaginal oestrogen.
- Retest August 24
- Following August testing we may commence bladder healing support with CystoProtek to support healing of the GAG layer as part of recovery. This will only be started if there is a negative test. CystoProtek includes chondroitin, glucosamine, hyaluronic acid, rutin, quercetin and olive pomace oil.

#TIP 3

- Sexual partners must be tested with Microgen DX Men's Key complete which assess semen and urine, to prevent possible reinfection. (Condom to be used until testing is possible)
- 25% of sexual partners have asymptomatic prostatitis.

INTRODUCING MR L

- Previous client 5 years ago following flouoroquinolone toxicity. Severe diarrhoea, weightloss, severe anxiety, unable to work for several months. Worked on gut health and SIBO and made a good recovery.
- Presented back with itchiness inside urethra, slight pain with urination, off-white discharge, severe fatigue, pus in urine. Standard urine cultures and STD tests came back negative but GP wondered if it might be a more rare STD and suggested an optional treatment. Keen to find out root cause with appropriate testing.
- General health very good until recent changes with bladder and prostate. Following carnivore diet for over a year.
- Started Microgen testing with the Men's Key Complete for urine and semen analysis.
- Commenced Kirkman biofilm defense before testing as 2 daily.

MR L MAY 23 URINE

RESISTANCE GENES DETECTED																				
None																				
LEVEL 2 NGS REPORT				ANTIMICROBIALS FOR CONSIDERATION																
COMPREHENSIVE IDENTIFICATION NEXT-GEN DNA SEQUENCING RESULTS with PRIOR PCR RESULTS.				Gram Stain	Respiration	Ampicillin/Amoxicillin	Extended spectrum penicillins/Beta-lactamase inhibitors e.g. Augmentin	Fluoroquinolones e.g. Levofloxacin	Fosfomycin	Penicillins e.g. Penicillin	Aminoglycosides+Aminopenicillins e.g. Ampicillin/Gentamicin	Glycopeptides e.g. Vancomycin	Linezolid (Zyvox)	Lipopeptides e.g. Colistin	Nitrofurantoin e.g. Macrobid	Anti-Pseudomonal penicillins/Beta-lactamase inhibitors e.g. Zosyn	Antifolates e.g. Bactrim	Aztreonam	Carbapenems e.g. Merrem	Cephalosporins First Gen e.g. Keflex
COMPLETE (NGS & PCR RESULTS)		DNA copies per mL	NGS																	
BACTERIAL LOAD	Low	< 10 ⁵	%																	
Enterococcus faecalis	NGS	70%	+	FAn	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Haemophilus influenzae	NGS	13%	-	FAn	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Finagoldia magna	NGS	2%	+	An	√	√			√											
FUNGI DETECTED			%	ANTIFUNGALS FOR CONSIDERATION																
None																				

MR L MAY 23 SEMEN

RESISTANCE GENES DETECTED																																								
Tetracycline tetM																																								
LEVEL 2 NGS REPORT				ANTIMICROBIALS FOR CONSIDERATION																																				
COMPREHENSIVE IDENTIFICATION NEXT-GEN DNA SEQUENCING RESULTS with PRIOR PCR RESULTS.				Gram Stain	Respiration	Aminoglycosides+ Aminopenicillins e.g. Ampicillin/Gentamicin	Ampicillin/Amoxicillin	Extended spectrum penicillins/Beta-lactamase inhibitors e.g. Aztreonam	Fluoroquinolones e.g. Levofloxacin	Fosfomycin	Glycopeptides e.g. Vancomycin	Linezolid (Zyvox)	Lipopeptides e.g. Colistin	Nitrofurantoin e.g. Macrobid	Penicillins e.g. Penicillin																									
COMPLETE (NGS & PCR RESULTS)			DNA copies (N/A)			NGS																																		
BACTERIAL LOAD			High	%																																				
Enterococcus faecalis			Low	98%	+	FAn	√	√	√	√	√	√	√	√	√																									
FUNGI DETECTED							ANTIFUNGALS FOR CONSIDERATION																																	
None																																								

KEY POINTS MAY 23

- Semen: Enterococcus faecalis high load 98%
- Urine: Enterococcus faecalis 70% low load
- Mr L was recommended amox-clav for 4 weeks
- Ruth diagnosed Retrograde ejaculation. This happens when some semen passes backwards into the bladder instead of out of the urethra and infection is translocated.
- Prescribing decisions based on microgen report and confirming prostate penetration of specific antibiotics.
- Risk factors for retrograde ejaculation: Diabetes, MS, some BP meds, and antidepressants.
- Prostatitis and IBS [Chronic Prostatitis/Chronic Pelvic Pain Syndrome is associated with Irritable Bowel Syndrome: A Population-based Study - PMC \(nih.gov\)](#)
- General prostate health support: Lycopene, vit D, green tea, zinc and omega 3.
- Keen to continue carnivore diet.

JULY 23 SEMEN MR L

RESISTANCE GENES DETECTED			ANTIMICROBIALS FOR CONSIDERATION																					
None			None																					
LEVEL 2 NGS REPORT COMPREHENSIVE IDENTIFICATION NEXT-GEN DNA SEQUENCING RESULTS with PRIOR PCR RESULTS.			COMPLETE (NGS & PCR RESULTS)		Gram Stain	Respiration	Fluoroquinolones e.g. Levofloxacin	Carbapenems e.g. Merrem	Tigecycline	Fosfomycin	Aminoglycosides e.g. Amikacin	Anti-Pseudomonal Penicillins e.g. Mezlin	Anti-Pseudomonal penicillins/Beta-lactamase inhibitors e.g. Zosyn	Colistin	Aminoglycosides+Aminopenicillins e.g. Ampicillin/Gentamicin	Ampicillin/Amoxicillin	Extended spectrum penicillins/Beta-lactamase inhibitors e.g. Aztreonam	Glycopeptides e.g. Vancomycin	Linezolid (Zyvox)	Lipopeptides e.g. Colistin	Nitrofurantoin e.g. Macrobid			
			BACTERIAL LOAD	NGS	Gram Stain	Respiration	PO	PO	IV	IV	IV	IV	IV	PO	PO	IV	IV	PO	IV	PO	IV	PO		
FUNGI DETECTED	NGS	%	ANTIFUNGALS FOR CONSIDERATION																					
None			None																					

KEY POINTS JULY 23 MR L

Urine: Staph haemolyticus 97% medium load (10 days flagyll)

Semen: Raoultella ornothinolytica (rare and can cause systemic infection) 4 weeks cefixime

Felt really poorly at this time and reported symptoms of systemic infection. Unable to work.

Continuing ornithine at night to reduce ammonia and urine pH
Continue probiotics, vit D and prostate support formula

MR L URINE SEPTEMBER 23

RESISTANCE GENES DETECTED																				
None																				
<h2 style="text-align: center;">LEVEL 2 NGS REPORT</h2> <p style="text-align: center;">COMPREHENSIVE IDENTIFICATION NEXT-GEN DNA SEQUENCING RESULTS with PRIOR PCR RESULTS.</p>				ANTIMICROBIALS FOR CONSIDERATION																
				Gram Stain	Respiration	Penicillins e.g. Penicillin	Fluoroquinolones e.g. Levofloxacin	Extended spectrum penicillins/Beta-lactamase inhibitors e.g. Amoxicillin	Glycopeptides e.g. Vancomycin	Aminoglycosides+Aminopenicillins e.g. Ampicillin/Gentamicin	Ampicillin/Amoxicillin	Fosfomycin	Linezolid (Zyvox)	Lipopeptides e.g. Colicin	Nitrofurantoin e.g. Macrobid	Aminoglycosides e.g. Amikacin	Clindamycin	Metronidazole (Flagyl)	Cephalosporins Second Gen e.g. Cefotaxim	
COMPLETE (NGS & PCR RESULTS)		DNA copies per mL	NGS %	Gram Stain	Respiration	Penicillins e.g. Penicillin	Fluoroquinolones e.g. Levofloxacin	Extended spectrum penicillins/Beta-lactamase inhibitors e.g. Amoxicillin	Glycopeptides e.g. Vancomycin	Aminoglycosides+Aminopenicillins e.g. Ampicillin/Gentamicin	Ampicillin/Amoxicillin	Fosfomycin	Linezolid (Zyvox)	Lipopeptides e.g. Colicin	Nitrofurantoin e.g. Macrobid	Aminoglycosides e.g. Amikacin	Clindamycin	Metronidazole (Flagyl)	Cephalosporins Second Gen e.g. Cefotaxim	
BACTERIAL LOAD	Low	< 10 ⁶	%																	
Enterococcus faecalis		NGS	72%	+	FAn	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Lactobacillus crispatus		NGS	14%	+	FAn	√										√	√			
Prevotella bivia		NGS	8%	-	An		√											√		
Streptococcus urinialis		NGS	4%	+	FAn	√		√	√											√
FUNGI DETECTED			%	ANTIFUNGALS FOR CONSIDERATION																
None																				

MR L SEMEN SEPT 23

RESISTANCE GENES DETECTED																							
None																							
LEVEL 2 NGS REPORT			ANTIMICROBIALS FOR CONSIDERATION																				
COMPREHENSIVE IDENTIFICATION NEXT-GEN DNA SEQUENCING RESULTS with PRIOR PCR RESULTS.			Gram Stain	Respiration	Ampricyclins/Aminopenicillins e.g. Ampicillin, Gentamicin	Ampicillin/Amoxicillin	Extended spectrum penicillins/Beta-lactamase inhibitors e.g. Augmentin	Fluoroquinolones e.g. Levofloxacin	Fosfomycin	Glycopeptides e.g. Vancomycin	Linezolid (Zyvox)	Lipopeptides e.g. Colistin	Nitrofurantoin e.g. Macrobid	Penicillins e.g. Penicillin									
COMPLETE (NGS & PCR RESULTS)		DNA copies per mL	NGS %	Gram Stain	Respiration	Ampricyclins/Aminopenicillins e.g. Ampicillin, Gentamicin	Ampicillin/Amoxicillin	Extended spectrum penicillins/Beta-lactamase inhibitors e.g. Augmentin	Fluoroquinolones e.g. Levofloxacin	Fosfomycin	Glycopeptides e.g. Vancomycin	Linezolid (Zyvox)	Lipopeptides e.g. Colistin	Nitrofurantoin e.g. Macrobid	Penicillins e.g. Penicillin								
BACTERIAL LOAD	High	> 10 ⁷	%	Gram Stain	Respiration	Ampricyclins/Aminopenicillins e.g. Ampicillin, Gentamicin	Ampicillin/Amoxicillin	Extended spectrum penicillins/Beta-lactamase inhibitors e.g. Augmentin	Fluoroquinolones e.g. Levofloxacin	Fosfomycin	Glycopeptides e.g. Vancomycin	Linezolid (Zyvox)	Lipopeptides e.g. Colistin	Nitrofurantoin e.g. Macrobid	Penicillins e.g. Penicillin								
Enterococcus faecalis	High	1.03 x 10 ⁷	100%	+	FAn	√	√	√	√	√	√	√	√	√	√								
FUNGI DETECTED			%	ANTIFUNGALS FOR CONSIDERATION																			
None																							

MR L SEPT 23

- Urine: low load Enterococcus Faecalis, good to see lacto crispatus at 14%
- Semen: Raoultella had completely gone. Still mildly symptomatic but felt systemic infection had cleared. Now Enterococcus faecalis at 100% high load
- 4 weeks of amox-clav was recommended.
- Systemic symptoms gradually cleared while taking the previous antibiotic. Was able to return to work.

MR L NOV 23 SEMEN

RESISTANCE GENES DETECTED																			
Tetracycline tetM																			
LEVEL 2 NGS REPORT COMPREHENSIVE IDENTIFICATION <i style="color: #00a6d1;">NEXT-GEN DNA SEQUENCING</i> RESULTS with PRIOR PCR RESULTS.	ANTIMICROBIALS FOR CONSIDERATION																		
	COMPLETE (NGS & PCR RESULTS)	DNA copies (N/A)	NGS	Gram Stain	Respiration	Aminoglycosides+Aminopenicillins e.g. Ampicillin/Gentamicin	Ampicillin/Amoxicillin	Extended spectrum penicillins/Beta-lactamase inhibitors e.g. Augmentin	Fluoroquinolones e.g. Levofloxacin	Fosfomycin	Glycopeptides e.g. Vancomycin	Linezolid (Zyvox)	Lipopeptides e.g. Colistin	Nitrofurantoin e.g. Macrobid	Penicillins e.g. Penicillin				
	BACTERIAL LOAD	Med	%			IV	PO	PO	PO	PO	IV	PO	IV	PO	PO				
	Enterococcus faecalis	Medium	100%	+	FAn	√	√	√	√	√	√	√	√	√	√				
FUNGI DETECTED		%	ANTIFUNGALS FOR CONSIDERATION																
None																			

MR L NOV 23 KEY POINTS

- Urine: Increased from Low to medium load Enterococcus faecalis medium load 99%
- Rhoditorola Mucilaginosa 99%
- Semen: Reduced from high to medium load of bacteria which is good progress.
Enterococcus faecalis 100% medium load
- Recommended amox-clav for 4 weeks and 2 weeks of itraconazole for the Rhoditorola
- Continued ornithine at night.

MR L FEB 24 URINE

Final Negative

The sample submitted for Comprehensive Identification had a negative result. Three attempts were made to amplify and identify any microbes present in the sample and verify the negative result. No further attempts will be made to run this sample.

Several factors could contribute to this, including:

- The patient specimen or microbial DNA concentrations in the specimen were at concentrations below the level of detection of the assay.
- The specimen underwent DNA degradation or contained PCR inhibitors due to high residual lidocaine or high residual disinfectants on the specimen collection site.

DISCLAIMER: (i) This test was developed and performance characteristics have been determined by Southwest Regional PCR Laboratory dba MicroGen DX. It has not been cleared or approved by the U.S. Food and Drug Administration (FDA), however, the FDA has determined that such clearance or approval is not necessary. This test is used for clinical purposes. Its use should not be regarded as investigational or for research. This laboratory is certified under the Clinical Laboratory Improvement Amendments of 1988 (CLIA 88) as qualified to perform high complexity clinical laboratory testing. (ii) A negative result does not rule out the presence of PCR inhibitors, or DNA extraction inhibitors such as lidocaine, in patients' specimens or microbial DNA concentrations below the level of detection of the assay. (iii) This test is performed pursuant to an agreement with Roche Molecular Systems, Inc. (iv) Relative quantitation of swabs refers to analyte load levels of $< 10^5$, 10^5 to 10^7 , and $> 10^7$ for low, medium and high respectively. Southwest Regional PCR Laboratory dba MicroGen DX licenses are CLIA 45D1086390 and CAP 7214171.

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MR L FEB 24 SEMEN

RESISTANCE GENES DETECTED				None																
LEVEL 2 NGS REPORT				ANTIMICROBIALS FOR CONSIDERATION																
				<p style="text-align: center; margin: 0;">COMPREHENSIVE IDENTIFICATION NEXT-GEN DNA SEQUENCING RESULTS with PRIOR PCR RESULTS.</p>																
COMPLETE (NGS & PCR RESULTS)		DNA copies (N/A)	NGS	Gram Stain	Respiration	Ampicillin/Anoxiciillin	Extended spectrum penicillins/Beta-lactamase inhibitors e.g. Augmentin	Fluroquinolones e.g. Levofloxacin	Fosfomycin	Nitrofurantoin e.g. Macrobid	Glycopeptides e.g. Vancomycin	Linezolid (Zyvox)	Lipopeptides e.g. Colistin	Aminoglycosides-Aminopenicillins e.g. Amikacin/Gentamicin	Penicillins e.g. Penicillin	Aminoglycosides e.g. Amikacin	Antifolates e.g. Bactrim	Carbapenems e.g. Merrem	Cephalosporins Third Gen e.g. Suprax	Tetracyclines e.g. Doxycycline
BACTERIAL LOAD			Low	%	PO	PO	PO	PO	PO	IV	PO	IV	IV	IV	IV	PO	PO	PO	PO	
Enterococcus faecalis		NGS	82%	+	FAn	√	√	√	√	√	√	√	√	√	√	√	√	√	√	
Escherichia coli		NGS	3%	-	FAn	√	√	√	√	√	√	√	√	√	√	√	√	√	√	
Corynebacterium tuberculostearicum		NGS	3%	+	FAn	√	√	√	√	√	√	√	√	√	√	√	√	√	√	
Varibaculum anthropi		NGS	2%								√	√		√					√	
FUNGI DETECTED		%		ANTIFUNGALS FOR CONSIDERATION																
None																				

MR L FEB 24 KEY POINTS

- Urine: negative
- Semen: Significant improvement with a low load and asymptomatic
- Enterococcus Faecalis at 82%
- Recommended Amox-clav as a final round to ensure this doesn't get worse again in the prostate.
- Continue ornithine at night.
- Continue vit D, probiotics and prostate formula.
- Final thoughts on management.



THANK YOU

BEVERLEY SARSTEDT

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