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Sepsis — Detection of Fastidious Organisms is a Bloody Mess

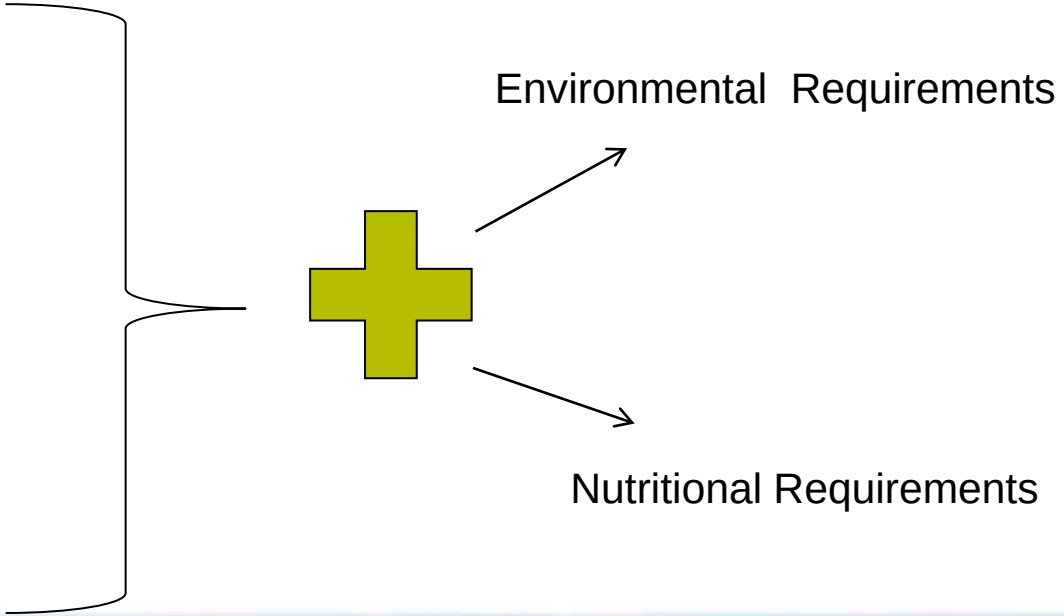
DeAna M. Paustian

Global Product Manager, Blood Culture/Mycobacteria

Fastidious Organism Recovery

Fastidious Organisms

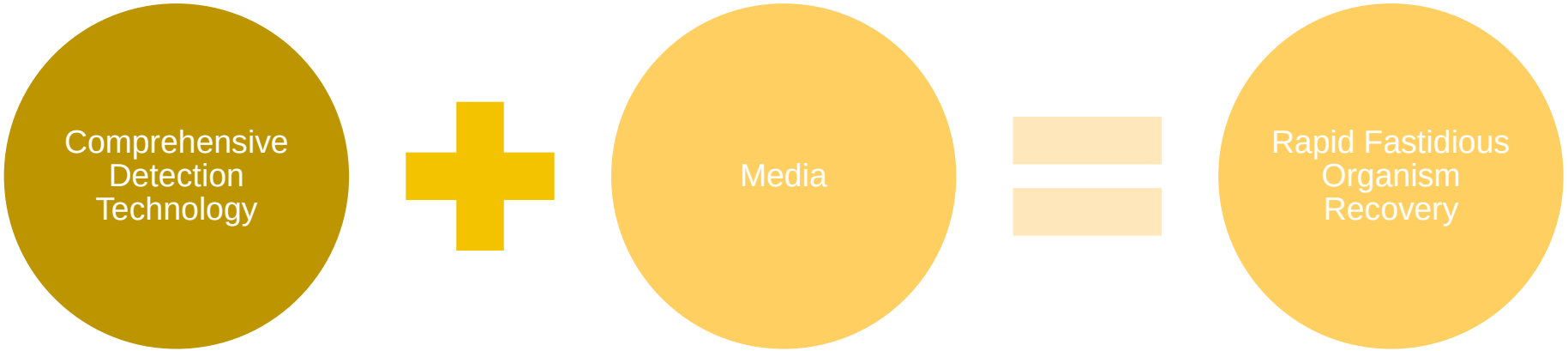
- Volume of blood drawn
- Timing of the blood draw
- Dilution ratio (blood-to-broth)
- Serum host factors
- Media used
- Antimicrobial therapy
- MIC of the organism
- Instrument used



E.J. Baron, et. al. 2005, Cumitech, Blood Cultures IV, Vol. 1C,

Fastidious Organisms

Thermo Scientific ™ VersaTREK™ Solution



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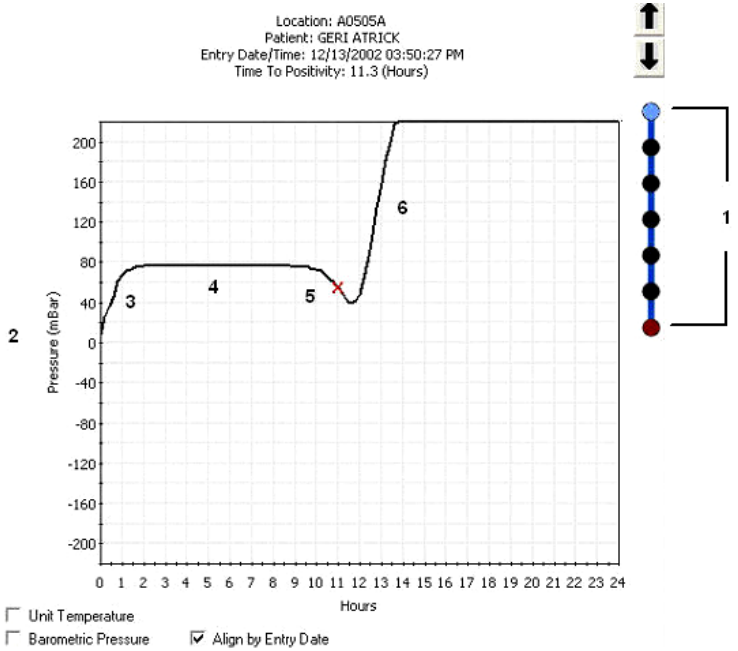
Comprehensive Detection Technology

- Measures both consumption of O_2 and production of all gases
  - (CO_2, N_2 and H_2)
- **Consistent detection for a wide range of microorganisms**
- Some organisms (anaerobes) produce N_2 or H_2.



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Media

Thermo Scientific ™ VersaTREK™ REDOX™ Design Requirements:

- ✓Grow and detect all metabolic microbial groups
- ✓Effective for all patient populations
- ✓Minimize blood as a nutritional factor
- ✓Dilution for antibiotics and serum factors

Fastidious Organism Performance

Comparison of the Thermo Scientific VersaTREK and the BacT/ALERT Blood Culture Systems for the Growth of Fastidious Microorganisms

S. Mirrett, et.al, DUMC, ASM 2005, Poster C-214

- Purpose of Study – To compare the VersaTREK and BacT/ALERT Systems in the recovery and time-to-detection of fastidious organisms
- O_2 and ANO_2 bottles from each system were tested
  - With and without human blood

With Blood (TTD in Hours)

Microorganism (n)	*REDOX O2 Blood*	*BacT/ALERT O2 Blood*	*REDOX AnO2 Blood*	*BacT/ALERT AnO2 Blood*
ß-strep Grp B (2)	10.6	10.8	14.0	10.6
E. faecalis (2)	10.0	11.5	12.9	10.8
E. faecium (2)	14.3	15.2	15.5	14.1
M. catarrhalis (3)	15.8	18.2	0.0	16.9
N. gonorrhoeae (1)	33.5	0.0	0.0	33.0
N. meningitidis (3)	18.0	23.5	0.0	18.6
H. aphrophilus (3)	24.7	32.2	20.7	19.9
A. actinomycetemcomitans (3)	29.4	48.2	53.0	32.4
C. hominis (3)	41.2	0.0	88.6	39.4
Eikenella sp. (3)	39.1	50.4	44.3	21.1
Kingella sp. (3)	23.7	60.8	0.0	18.6
B. bronchiseptica (3)	19.4	22.4	19.2	15.3
C. jejuni (3)	35.2	0.0	0.0	32.9

Comparison of the VersaTREK and the BacT/ALERT Blood Culture Systems for the Growth of Fastidious Microorganisms
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Without Blood (TTD in Hours)

Microorganism (n)	*REDOX O2 Blood*	*BacT/ALERT O2 Blood*	*REDOX AnO2 Blood*	*BacT/ALERT AnO2 Blood*
ß-strep Grp B (2)	11.2	12.2	14.5	11.0
E. faecalis (2)	10.9	38.9	12.9	11.1
E. faecium (2)	14.8	16.5	16.2	14.9
M. catarrhalis (3)	16.4	19.5	0.0	40.0
N. gonorrhoeae (1)	38.4	0.0	0.0	0.0
N. meningitidis (3)	20.6	42.0	0.0	20.3
H. aphrophilus (3)	24.2	18.0	41.6	20.4
A. actinomycetemcomitans (3)	43.3	62.4	63.8	39.1
C. hominis (3)	34.4	0.0	0.0	56.3
Eikenella sp. (3)	15.6	0.0	0.0	21.5
Kingella sp. (3)	23.8	0.0	0.0	27.5
B. bronchiseptica (3)	21.3	24.1	19.1	16.6
C. jejuni (3)	55.7	0.0	0.0	57.6

Comparison of the VersaTREK and the BacT/ALERT Blood Culture Systems for the Growth of Fastidious Microorganisms
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Fastidious Organism Performance

Thermo Scientific VersaTREK it's in the Blood … an Evaluation of a New System

Paul Haworth, et.al, East Lancashire, Bio-Stat Diagnostic Systems, 2009, Poster

- Purpose of Study - To compare the performance of all three continuous blood culture systems for the isolation of fastidious microorganisms and the effects of blood volume on recovery and time to detection
- Twenty-two bacterial strains were tested. Inoculums used were between 10-100 CFU per ml.
- One aerobic and anaerobic bottle was inoculated for each system and organism tested.

Mean TTD for All Organisms Tested

Organism	Times to Detection (TTD) hours					
	VersaTREK		BACTEC		BacT/ALERT	
	Redox 1	Redox 2	Aerobic	Anaerobic	Aerobic	Anaerobic
Gram Negative						
A. lwoffii	19	ND	18.77	ND	27.3	ND
B. cepacia	18	32.2	20.93	ND	23.8	ND
E. cloacae	14	19.28	15.27	23.55	14.3	17.2
C. freundii	14.4	17.4	14.93	13.77	13.5	14.7
E. coli	10.8	13.9	12.6	13.1	12.8	11.0
K. pneumoniae	11.8	15.6	12.6	12.6	12.5	ND
S. maltophilia	21.8	118.2	ND	ND	26.2	ND
Gram Positive						
E. faecalis	13.2	13.8	12.41	13.24	13.8	12.2
L. monocytogenes	19.3	21.29	16.66	22.72	19.2	20.3
S. aureus	11.9	18.2	15.5	18.85	17	15.2
S. epidermidis	18.2	27.2	55.7	27.17	25.5	23.7
S. agalactiae	34.2	14.4	13.2	13.82	15.3	16.24
S. pneumoniae	15.8	18.0	13.75	41.35	17.3	16.7
Anaerobes						
B. fragilis	ND	30	ND	24.19	ND	28
C. perfringens	ND	11.5	ND	32.43	ND	11.8
F. necrophorum	ND	28.4	ND	70.78	ND	ND
P. anaerobius	ND	23.3	ND	ND	ND	ND

Paul Haworth, et.al, East Lancashire, Bio-Stat Diagnostic Systems, 2009, Poster

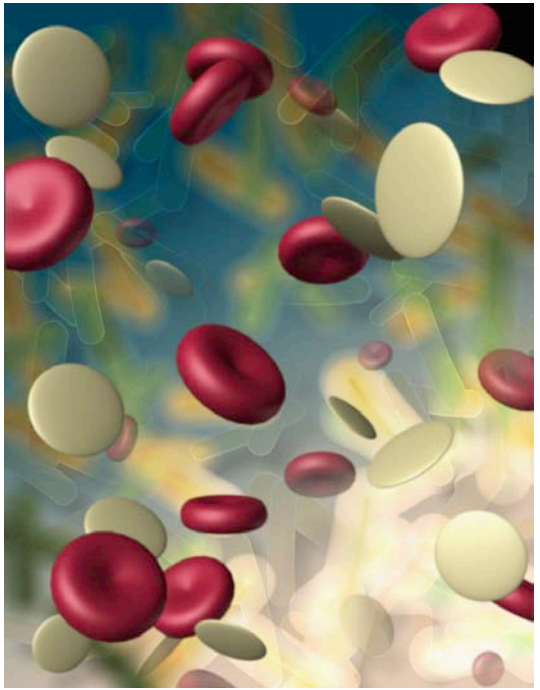
Blood Volume

Organism blood volume (ml)	Times to Detection (TTD) hours					
	VersaTREK		BACTEC		BacT/ALERT	
	Redox 1	Redox 2	Aerobic	Anaerobic	Aerobic	Anaerobic
B. bronchiseptica						
0.1	27	133.9	27.52	ND	27.8	ND
0.5	10.1	53.2	24.96	ND	11	ND
1.5	26.3	138.7	26.33	ND	10.8	ND
C. jejuni						
0.1	69.2	ND	ND	64.12	ND	33
0.5	57.5	48.3	ND	ND	ND	32.5
1.5	48.5	63.1	ND	ND	ND	35.8
H. influenzae						
0.1	25.8	58.2	20.17	ND	ND	ND
0.5	50	20.2	9.79	21.71	ND	ND
1.5	ND	34	15.82	17.49	20.5	11.7
N. gonorrhoeae						
0.1	21.1	126.3	ND	ND	ND	ND
0.5	50.5	ND	ND	ND	ND	ND
1.5	22.9	ND	31.14	ND	ND	ND
N. meningitidis						
0.1	22.9	125.5	20.35	ND	22.7	ND
0.5	9.9	110.3	ND	ND	21.2	ND
1.5	22.7	141.5	19.33	ND	19.7	11

Paul Haworth, et.al, East Lancashire, Bio-Stat Diagnostic Systems, 2009, Poster

Fastidious Organisms Which Signal on Gas Consumption

- *Brucella suis*
- *Helicobacter* spp.
- *Nocardia* spp.
- *Campylobacter* spp.
- *Brevundimonas vesicularis*
- *Rhodococcus equi*
- *Trichosporum beigelii*
- *Mycobacteria* spp.



Reference: VersaTREK and ESP Culture System II Graph Analysis/Internal Data

Questions