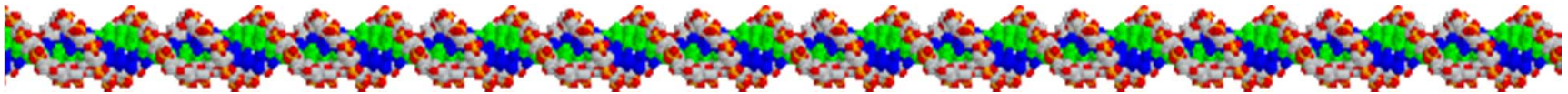


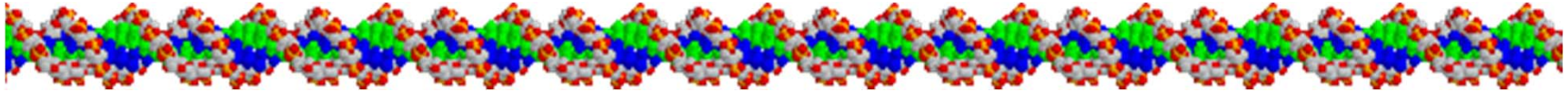
**Student Perspectives
on the Use of Biolog GenIII Plates
in Undergraduate Research
and a General Microbiology Course**



Jordan Krebs & Jeff Newman

Lycoming College
Williamsport, PA

Talk Contents



- The use of Biolog GenIII in:
 - General microbiology class
 - Research
 - Novel Species work
 - Correlation to Genomics

REVOLUTIONARY GEN III

Biolog's 3rd Generation identification technology with breakthrough advantages.

- NO Gram stain
- NO pre-tests & NO follow-on tests
- One panel for both GN & GP bacteria
- One minute setup
- One thousand+ species coverage

NEW

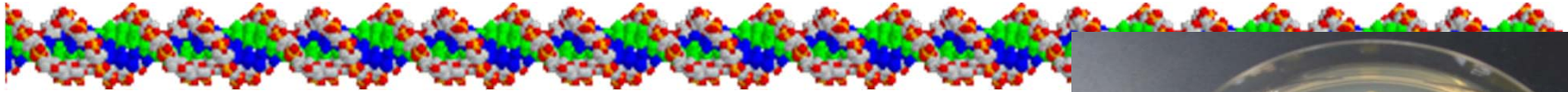
OmniLog

THE BIG BREAKTHROUGH is the new redox chemistry which enables testing of gram negative and gram positive bacteria in the same test panel. Gram stain and other pre-tests are no longer needed. You proceed directly to a one minute setup protocol - Done! Purchasers of previous Biolog instruments can quickly and easily upgrade to GEN III without purchasing new equipment. The expanded GEN III database is designed to meet the needs of Biolog's broad customer base covering diverse disciplines of microbiology.

Rewarding our customers with innovation and greater performance for more than 20 years.

BIOLOG

The LycoMicro Unknown Microbe Lab



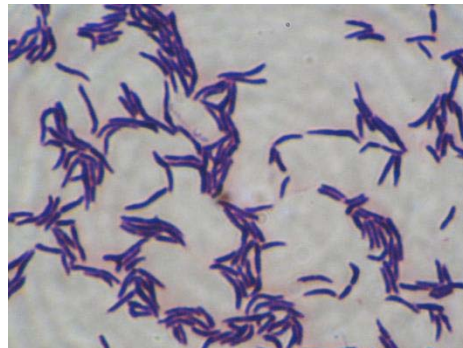
Week 1 - Aseptic technique/Inoculation

- pipetting sterile media
- selection of knowns and unknowns
- streak plates, inoculation of liquid
- preparation of frozen permanents



Week 2 – Staining & Microscopy

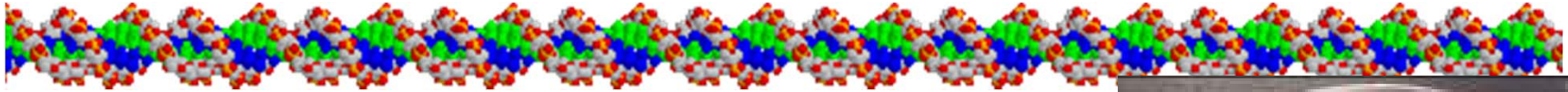
- Gram stain
- Endospore stain
- Wet mount



- ## Week 3 – Antibiotic sensitivity, pH, [NaCl], Temperature, Oxygen requirements
- Kirby-Bauer Disk Diffusion assay (10)
 - oxidase, catalase, Gas-Pak Jar



The LycoMicro Unknown Microbe Lab



Week 4 – Carbohydrate & Nitrogen Metabolism

- MRVP, citrate, phenol red, TSI
- urease, nitrate reduction, SIM

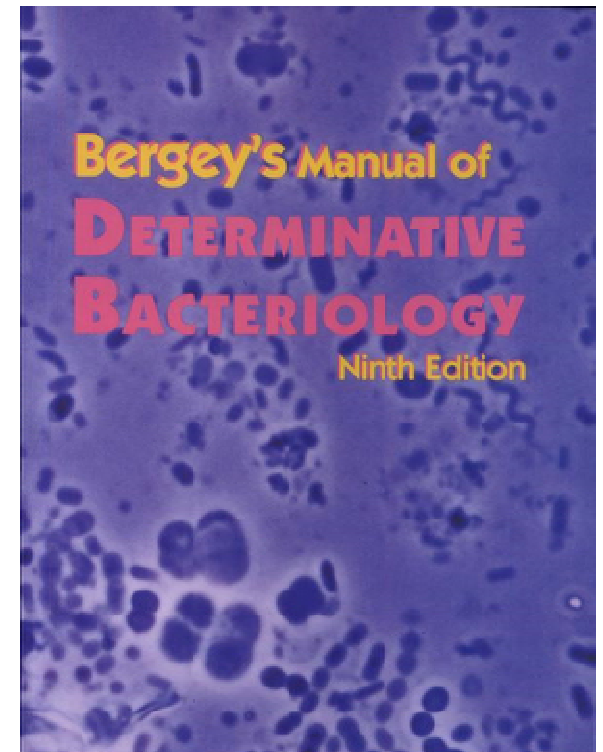
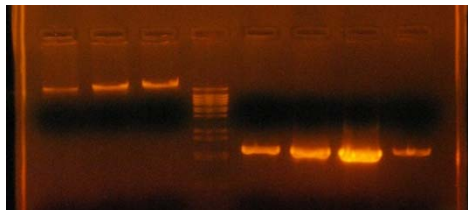


Week 5 – Exoenzymes, Differential/Selective media

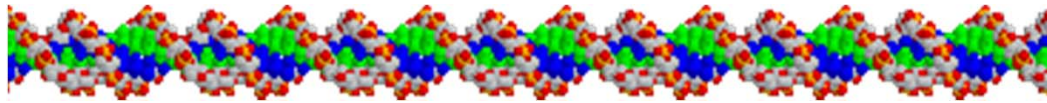
- caseinase, lipase, amylase, DNase,
- EMB, HEA, MSA, PhenylEthanol,
- Bile Esculin, Brilliant Green, EG Min.

Week 6 - PCR of 16S rDNA, gel, send for sequencing.

- Bergey's Manual → Hypothesis



The LycoMicro Unknown Microbe Lab



Week 7 – MIDI – FAME Analysis

- BUG+Blood (Hemolysis) → **Biolog GenIII Plates**

Week 8 – Analyze DNA sequence @EzTaxon.org,

- Construct Phylogenetic Tree w/MEGA,
- Literature Research (IJSEM)

RT	Response	ArHt	RFact	ECL	Peak Name	Percent	Comment1	Comment2
0.7087	997637	0.005	----	6.5830		----	<min rt	
0.7150	2.392E+9	0.025	----	6.6245	SOLVENT PEAK	----	<min rt	
0.9403	3636	0.019	----	8.1196		----	<min rt	
1.4058	344	0.009	----	10.9549	unknown 10.9523	----	ECL deviates 0.002	
1.6463	1040	0.011	1.060	12.0005	12.0	0.30	ECL deviates 0.001	Reference -0.009
2.1563	542	0.010	----	13.8325		----		
2.2050	5594	0.009	0.989	13.9985	14.0	1.52	ECL deviates -0.001	Reference -0.009
2.3660	482	0.009	----	14.5305	unknown 14.502	----	ECL deviates 0.004	
2.5146	1057	0.009	----	15.0020	15.0	----	ECL deviates 0.002	
2.6788	5932	0.009	0.954	15.5175	Sum In Feature 2	1.56	ECL deviates 0.002	14:0 3OH/16:1 iso1
2.7816	138178	0.009	0.948	15.8402	Sum In Feature 3	36.00	ECL deviates 0.000	16:1 w7c/16:1 w6c
2.8086	600	0.009	0.946	15.9253	16:1 w3c	0.16	ECL deviates -0.003	
2.8326	141842	0.009	0.945	16.0006	16:0	36.85	ECL deviates 0.001	Reference -0.007
3.1245	34913	0.009	0.932	16.9158	Sum In Feature 3	8.94	ECL deviates 0.001	17:0 cyclo
3.1518	1097	0.009	0.931	17.0014	17:0	0.28	ECL deviates 0.001	Reference -0.006
3.4195	52052	0.009	0.921	17.8442	Sum In Feature 8	13.19	ECL deviates -0.003	18:1 w7c
3.4686	3044	0.009	0.920	17.9889	18:0	0.77	ECL deviates -0.001	Reference -0.009
3.4964	918	0.009	0.919	18.0885	18:1 w7c 11-methyl	0.23	ECL deviates 0.002	
3.7579	773	0.010	0.912	18.9333	Sum In Feature 8	0.19	ECL deviates 0.001	19:0 cyclo w8c
----	5932	----	----	----	Summed Feature 2	1.56	16:1 iso1/14:0 3OH	14:0 3OH/16:1 iso1
----	173091	----	----	----	Summed Feature 3	44.95	16:1 w7c/16:1 w6c	16:1 w6c/16:1 w7c
----	----	----	----	----	----	----	17:0 cyclo	
----	52826	----	----	----	Summed Feature 8	13.38	18:1 w7c	18:1 w6c
----	----	----	----	----	----	----	19:0 cyclo w8c	

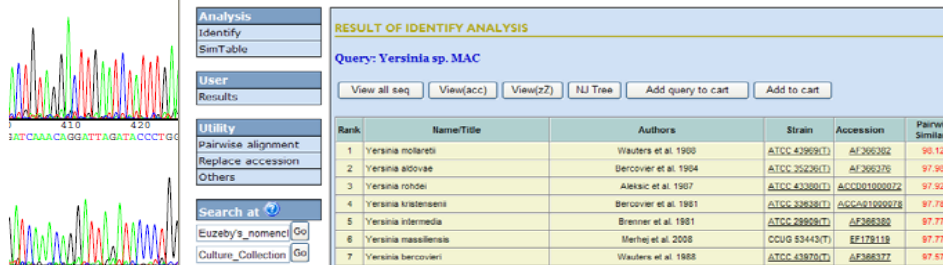
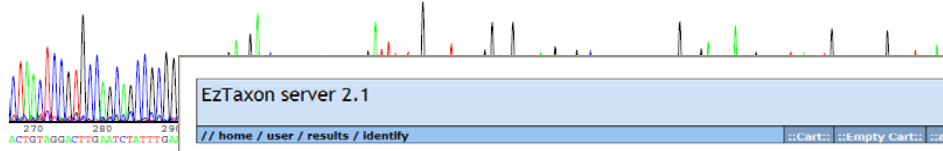
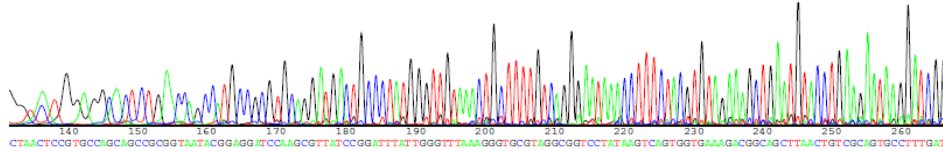
ECL Deviation: 0.002
Total Response: 386527
Percent Named: 99.86%

Reference ECL Shift: 0.008
Total Named: 385984
Total Amount: 363709
Number Reference Peaks: 5

Matches:

Library	Sim Index	Entry Name
ITS1 1.10	0.890	Serratia-liquefaciens (confirm with other tests)
	0.797	Pantoea-agglomerans-biogroup 1B (confirm with other tests)
	0.648	Ewingella-americana
	0.579	Edwardsiella-tarda
	0.537	Pseudomonas-putida-GC subgroup B
	0.537	Yersinia-frederiksenii/enterocolitica/intermedia

File: Mar2010_D02.ab1 Run Ended: Mar 11, 2010, 18:54:54 Signal G-6179 A-9494 T-10650 C-9274 Comment:
Sample: G3 Lane: 10 Base spacing 12.25 911 bases in 11204 scans Page 1 of 1



EzTaxon server 2.1

// home / user / results / identify ::Cart:: ::Empty Cart:: ::account:: ::logout:: ::how to cite:: ::q & a::

Analysis
Identify
SimTable

User
Results

Utility
Pairwise alignment
Replace accession
Others

Search at
Euzebry's nomenclature
Culture Collection

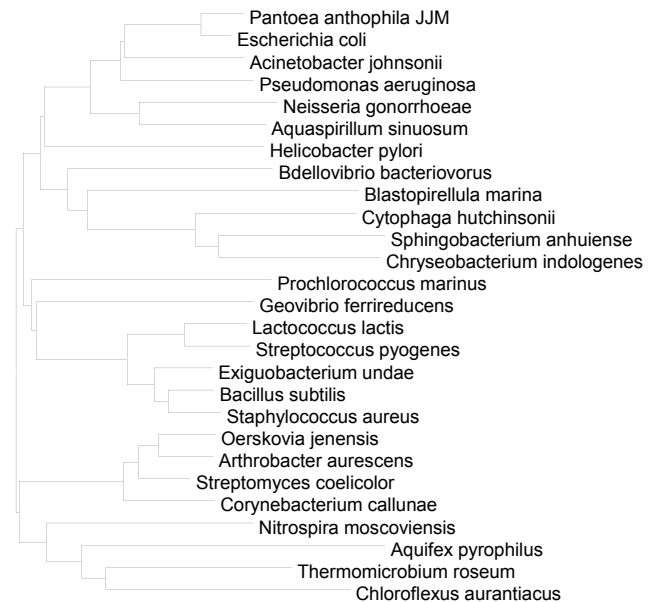
Duration or Comments?
Please email to
john (at) eu.ac.ir

RESULT OF IDENTIFY ANALYSIS

Query: Yersinia sp. MAC

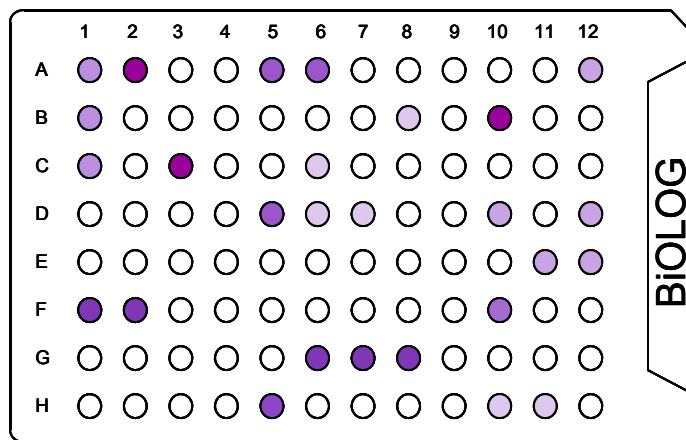
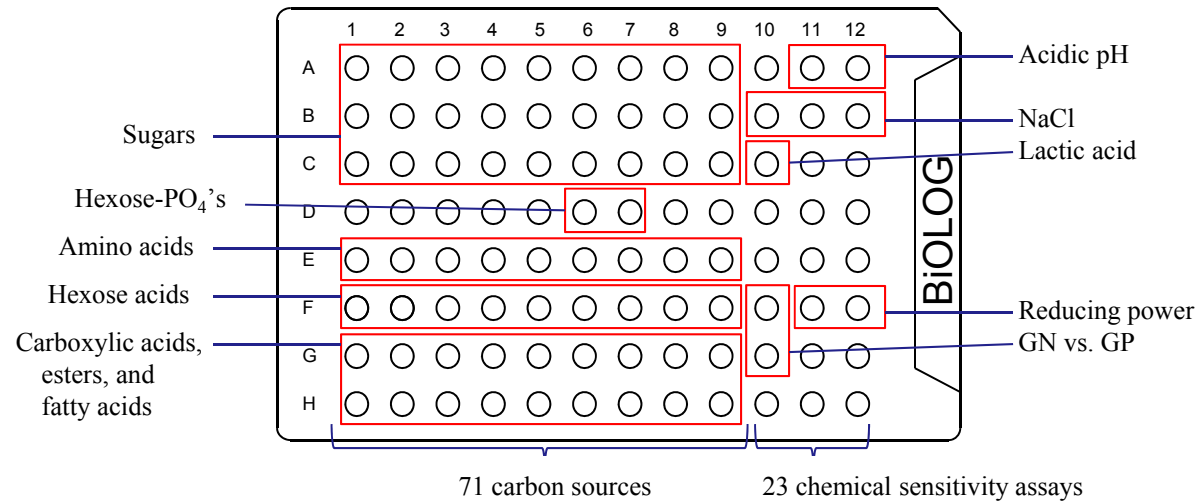
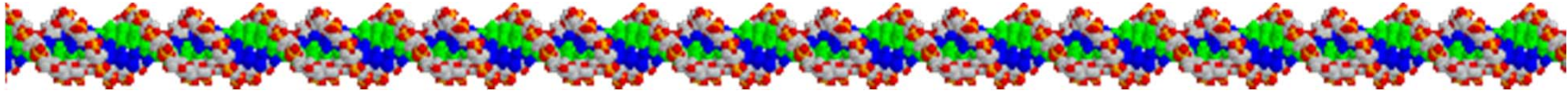
View all seq View(acc) View(zf) NJ Tree Add query to cart Add to cart

Rank	Name/Title	Authors	Strain	Accession	Pairwise Similarity	DNA Total nt	MESBLAST score	BLASTN score	Tasks
1	Yersinia motile	Wauters et al. 1990	ATCC 47869(T)	AF266262	99.126	271441	2666	2044	
2	Yersinia aldovae	Bercover et al. 1994	ATCC 35236(T)	AF266276	97.900	291441	2050	2029	
3	Yersinia rohdei	Alexis et al. 1997	ATCC 47869(T)	AF266272	97.927	301447	2068	2040	
4	Yersinia kristensenii	Bercover et al. 1991	ATCC 33838(T)	AF266278	97.787	321446	2028	2097	
5	Yersinia intermedia	Brenner et al. 1981	ATCC 29898(T)	AF266280	97.779	321441	2028	2005	
6	Yersinia massiliensis	Merhej et al. 2008	CCUG 53443(T)	EF178118	97.779	321441	2018	2005	
7	Yersinia bercoveri	Wauters et al. 1988	ATCC 43870(T)	AF266277	97.671	351441	2003	2081	
8	Yersinia enterocolitica subsp. enterocolitica	(Schleifman and Coleman 1939) Frederiksen 1964	ATCC 9610(T)	AF266279	97.571	351441	2003	2081	
9	Yersinia aleksici	Sprague and Neubauer 2005	Y159(T)	AF266281	97.461	351415	2027	2010	
10	Yersinia pestis	(Lehmann and Neumann 1896) van Loghem 1944	ATCC 19428(T)	X75274	97.409	371428	2015	2496	
11	Yersinia pseudotuberculosis	(Pfeiffer 1909) Smith and Thal 1905	ATCC 29832(T)	AF266275	97.303	301441	2079	2057	
12	Yersinia ruckeri	Ewing et al. 1970	ATCC 29472(T)	X75275	97.303	391446	2095	2059	
13	Yersinia similis	Sprague et al. 2008	Y220(T)	AM182404	97.236	401447	2101	2059	

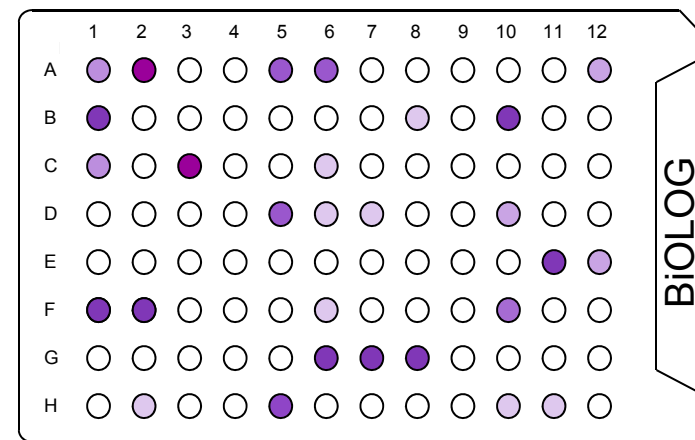


0.02

Biolog GenIII plates

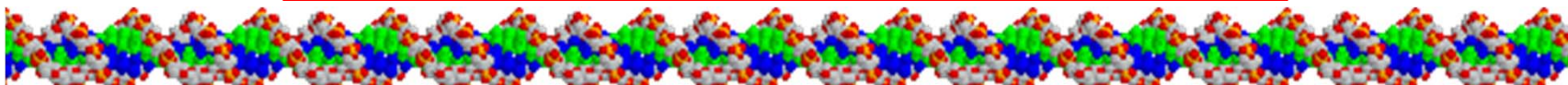


isolate under study



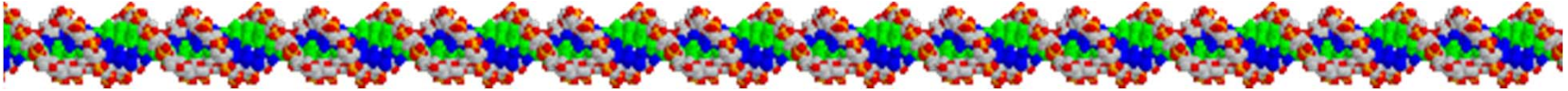
database

Compared to: Gram Negative / Positive



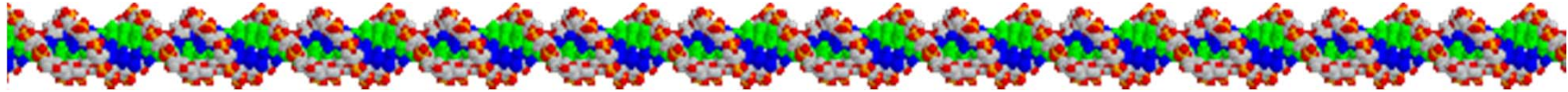
	1	2	3	4	5	6	7	8	9	10	11	12
A	negative control	Dextrin amylose glu- α 1-4, α 1-6 poly	D-maltose glu- α 1-4- glu	D-trehalose glu- α 1- α 1- glu	D-cellobiose glu- β 1-4- glu	gentiobiose glu- β 1-6- glu	Sucrose glu- α 1- β 2- fru	D-turanose glu- α 1- α 3- fru	Stachyose gal(α 1 $\rightarrow$ 6) gal(α 1 $\rightarrow$ 6) glc(α 1 $\leftrightarrow$ 2 β) fru	positive control	pH 6	pH 5
B	D-raffinose gal- α 1-6- glu- α 1- β 2- fru	α-D-lactose gal- β 1-4- glu (α)	D-melibiose gal- α 1-6- glu	β -methyl-D- glucoside	D-salicin aspirin- β 1- glu	N-acetyl-D-glucosamine	N-acetyl- β - D-mannos- amine	N-acetyl-D- galactos- amine	N-acetyl neuraminic acid	1% NaCl	4% NaCl	8% NaCl
C	α -D-glucose	D-mannose	D-fructose	D-galactose	3-methyl glucose	D-fucose	L-fucose	L-rhamnose	inosine	1% Na-lactate	fusidic acid	D-serine
D	D-sorbitol	D-mannitol	D-arabitol	myo-inositol	glycerol	D-glucose-6-PO ₄	D-fructose-6-PO ₄	D-aspartic acid	D-serine	Troleandomycin	rifamycin SV	minocycline
E	gelatin	glycyl-L-proline	L-alanine	L-arginine	L-aspartic acid	L-glutamic acid	L-histidine	L-pyroglutamic acid	L-serine	lincomycin	guanidine HCl	niaproof 4
F	pectin	D-galacturonic acid	L-galacturonic acid lactone	D-gluconic acid	D-glucuronic acid	Glucuronamide	mucic acid	quinic acid	D-saccharic acid	vancomycin	tetrazolium violet	tetrazolium blue
G	p-hydroxyphenylacetic acid	sodium methyl pyruvate	D-lactic acid methyl ester	L-lactic acid	citric acid	α -keto-glutaric acid	D-malic acid	L-malic acid	bromo-succinic acid	nalidixic acid	LiCl	K-tellurite
H	tween-40	γ -amino-butyric acid	α -hydroxy-butyric acid	β -hydroxy-D,L-butyric acid	α -keto-butyric acid	acetoacetic acid	propionic acid	acetic acid	formic acid	aztreonam	Na butyrate	Na bromate

Biolog GenIII plates

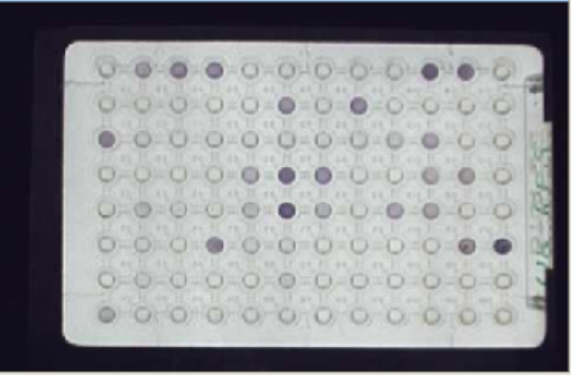


- Used for identification of environmental unknowns
- **Used for confirmation of phenotypes, comparison to literature, comparison to genomes.**
 - Amylase → dextrin
 - Gelatinase → gelatin well more sensitive
 - Kirby-Bauer → Nalidixic Acid, Rifamycin
 - API 20E → gelatin, lactose, glucose, arabinose, mannitol, melibiose, citrate, arabinose, sucrose, rhamnose, b-methyl-glucoside
 - API 20NE → gelatin, lactose, glucose, arabinose, mannose, mannitol, maltose, malic acid, N-acetyl-glucosamine, gentiobiose, citrate, b-methyl-glucoside
 - API ZYM → lactose, melibiose, b-methyl-glucoside, fucose, maltose, cellobiose
 - Biolog GN & GP → many

Output Included in Lab Report



Video of Last Read



Data Value

	1	2	3	4	5	6	7	8	9	10	11	12
A												
B												
C												
D												
E												
F												
G												
H												

Positive Value

	1	2	3	4	5	6	7	8	9	10	11	12
A												
B												
C												
D												
E												
F												
G												
H												

Plate Info

Position	(34) 17B
Protocol	A
Temp	25
Media	BUG-B
Agar Temp	0
Gram	N/A
OrgType	N/A
Species	
Strain	
DataFileName	IDS_350_130221_A.D5E
NumReads	144
Strain Design	RES
Presumptive	Unknown
Growth media	Bug plus Blood
Researcher	Rachel Schulze
Date yyyy-mm	2013-02-21
Type strain?	nt

ID

☒ Compare to ID Database Final ID

Species ID: *Iodobacter fluviatilis*

	PROB	SIM	DIST	Organism Ty	Species
==>1	0.572	0.504	1.907	GN-NENT	<i>Iodobacter fluviatilis</i>
2	0.180	0.144	3.021	GN-NENT	<i>Sphingomonas paucimobilis</i> B
3	0.150	0.121	3.193	GN-NENT	<i>Pseudomonas agarici</i>
4	0.098	0.075	3.609	GN-FAS	<i>Haemophilus haemolyticus</i>

Plate Status

Plate Done ☐ Incubation Hours

Current Status ☐ Current Incubation Hours

Plate Done ☐ 36

Mark Plate As Done New

Restore Plate 0 Apply

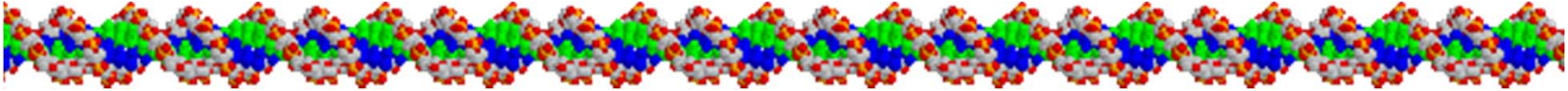
View Database

☐ View DB on ID Row Click

Done

Print Screen Print Report Print Preview

Biolog GenIII plates



- Used for identification of environmental unknowns →
 - 10% correct species, (but >25% novel species)
 - 80-90% correct genus
- Used for confirmation of phenotypes, comparison to literature, comparison to genomes.
 - Amylase → dextrin
 - Gelatinase → gelatin well more sensitive
 - Kirby-Bauer → Nalidixic Acid, Rifamycin
 - API 20E → gelatin, lactose, glucose, arabinose, mannitol, melibiose, citrate, arabinose, sucrose, rhamnose, b-methyl-glucoside
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 - API ZYM → lactose, melibiose, b-methyl-glucoside, fucose, maltose, cellobiose
 - Biolog GN & GP → many

Green = Correct species
Yellow = correct genus

initials	16S rRNA seq	%ID	Biolog	Sim	FAME	Sim
RNG	Aeromonas salmonicida	100	Aeromonas bestiarum	0.958	Aeromonas hydrophila	0.234
VLK	Arthrobacter chlorophenolicus novum	98.64	Arthrobacter histidinolovorans	0.564	Arthrobacter-pascens	0.215
MJK	Arthrobacter oryzae novum	97.4	Arthrobacter ilicis	0.271	Arthrobacter globiformis	0.286
AHK	Bacillus aryabhatai	99.64	Bacillus coagulans	0.137	no match - low % named	
CMT	Bacillus aryabhatai	100	Lactobacillus reuteri	0.168	Bacillus megaterium	0.352
ECW	Bacillus aryabhatai	100	Bacillus megaterium	0.205	Bacillus megaterium	0.446
EKP	Bacillus aryabhatai	100	Bacillus licheniformis	0.265	Bacillus megaterium	0.634
LAG	Bacillus aryabhatai	99.5	Corynebacterium freneyi Bm#3	0.163	Bacillus megaterium	0.495
NLO	Bacillus aryabhatai	100	Staphylococcus arletae Bac# 2-4	0.134	no match - low % named, <75000	
SRF	Bacillus aryabhatai	100	Bacillus coagulans	0.144	Bacillus megaterium	0.353
CED	Bacillus indicus	99.86	Bacillus firmus	0.312	No matches found in iTSA1	
SJS	Bacillus indicus novum	96.8	Exiguobacterium undae Bac#2&4	0.191	Bacillus circulans	0.18
AKS	Bacillus megaterium	99.72	Bacillus megaterium	0.168	Bacillus megaterium	0.495
BNH	Bacillus megaterium	99.6	Bacillus licheniformis	0.243	Bacillus megaterium	0.364
KMJ	Bacillus megaterium	97.45 bad	Bacillus cereus/thuringensis	0.18	no match - low % named, <75000	
KET	Bacillus mycoides	100	Aquaspirillum peregrinum	0.182	No matches found in iTSA1	
LEB	Bacillus r					
MAL	Bacillus t					
MSS	Bacillus t					
SRB	Bacillus t					0.203
KLK	Comamo					0.554
LMR	Dermaco					
AJG	Duganell					0.669
VKK	Dyadoba					
KAR	Exiguobacterium artemiae	99.6	Exiguobacterium undae	0.998	No matches found in iTSA1	
JMR	Exiguobacterium indicum	99.6	Exiguobacterium undae	0.998	No matches found in iTSA1	
KAM	Exiguobacterium indicum	99.49	Exiguobacterium undae	0.326	No matches found in iTSA1	
TLH	Exiguobacterium indicum	99.43	Vibrio mediterranei Exig undae #2	0.407	No matches found in iTSA1	
KMA	Flavobacterium frigidimaris novum	97.92	Flavobacterium hydatis	0.163	No matches found in iTSA1	
AED	Flavobacterium reichenbachii novum	97.06	Flavobacterium miztui	0.216	no match - low % named	
ABG	Flavobacterium succinicans novum	96.9	Flavobacterium hydatis	0.729	no match - low % named	
ARD	Flavobacterium succinicans novum	96.95	no growth		no match - low % named	
JAC	Flavobacterium succinicans novum	96.95	no growth		no match - low % named	
SHE	Flavobacterium succinicans novum	96.73	Flavobacterium johnsonii	0.394	no match - low % named, <75000	
BMS	Frigoribacterium faeni	99.18	Clavibacter michiganensis	0.182	no match - low % named, <75000	
RES	Iodobacter fluviatilis	99.07	Iodobacter fluviatilis	0.574	Deinococcus-radiodurans	0.363
CNN	Janthinobacterium lividum	99.87	Janthinobacterium lividum	0.324	No matches found in iTSA1	
KLP	Janthinobacterium lividum	99.87	Pseudomonas mephitica JI=#3	0.718	Janthinobacterium lividum	0.458
ANG	Microbacterium maritypicum	99.87	Microbacterium saperdae	0.721	Microbacterium hydrocarbonoxydans	0.452
CJA	Pseudomonas fragi	100	Pseudomonas fluorescens	0.772	Acidovorax-facilis	0.885
SAW	Pseudomonas fuscovaginae novum	98.45	Pseudomonas syringae pv helianthus	0.224	Acidovorax-facilis Pp#4	0.72
ARC	Pseudomonas lurida	100	Pseudomonas fluorescens	0.671	Acidovorax-facilis	0.732

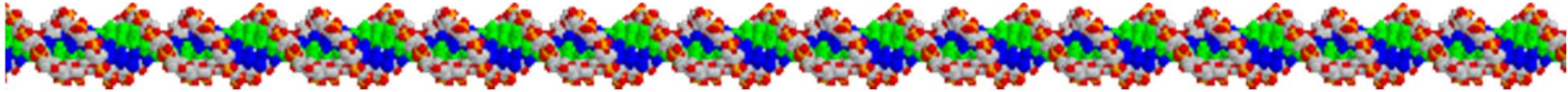
Biolog GENIII results:

Used for identification of environmental unknowns :

10% correct species, (but >25% novel species)

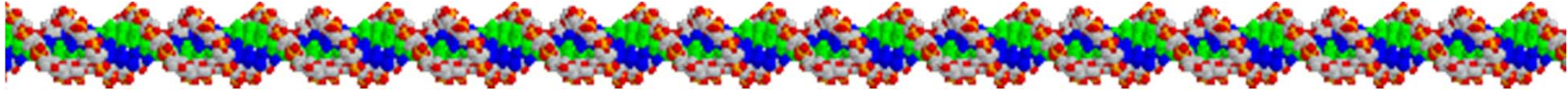
80-90% correct genus

Class Phylogenetic Clustering



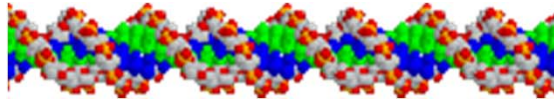
	Sample	AED	KMA	ABG	SEH	TLH	VKK	RES	CNN	KLP	KLK	ARC	CJA	SAW	RNG	ANG	BMS	LMR	VLK	MIK	TLH	JMR	KAM	KAR	CED	SJS	LEB	KET	MAL	MSS	SRB	AKS	KMI	BNH	LAG	ECW	SRF	AHK	NLO	EKP	CMT	
	16S ID	Flavobacterium novum	Flavobacterium novum	Flavobacterium novum	Flavobacterium novum	Kaistella koreensis	Dyadobacter soli	Iodobacter fluvialis	Janthinobacterium lividum	Janthinobacterium lividum	Comamonas testosteroni	Pseudomonas lurida	Pseudomonas fragi	Pseudomonas novum	Aeromonas salmonicida	Microbacterium maritimum	Frigeribacterium faeni	Demacoccus nishinomiyaensis	Arthrobacter novum	Arthrobacter cryzae novum	Exiguobacterium indicum	Exiguobacterium indicum	Exiguobacterium indicum	Exiguobacterium artemiae	Bacillus indicus	Bacillus novum	Bacillus mycoides	Bacillus mycoides	Bacillus thuringiensis	Bacillus thuringiensis	Bacillus thuringiensis	Bacillus megaterium	Bacillus megaterium	Bacillus megaterium	Bacillus aryabhattai	Bacillus aryabhattai	Bacillus aryabhattai	Bacillus aryabhattai	Bacillus aryabhattai	Bacillus aryabhattai	Bacillus aryabhattai	
A01	neg control	9	16	20	22	6	15	13	11	12	13	10	17	12	6	15	13	88	16	15	37	31	47	9	65	23	91	98	92	93	92	84	96	4	74	90	95	78	5	49	14	
A02	dextrin	98	90	99	99	76	33	51	24	17	19	14	22	21	97	97	95	97	96	94	99	98	98	99	95	99	96	75	94	97	94	98	99	98	99	96	99	97	98	96	32	
A03	D-maltose	98	87	98	97	99	49	98	79	99	14	6	6	12	95	98	97	98	96	97	96	99	94	98	97	45	68	99	95	98	95	94	96	97	89	96	86	85	98			
A04	D-trehalose	98	89	98	99	12	32	97	10	9	14	20	24	12	94	97	97	98	95	96	97	97	96	99	90	97	97	52	88	99	98	97	95	95	88	94	96	94	91	89	13	
A05	D-cellobiose	98	87	98	99	13	51	14	88	98	14	7	5	13	12	98	98	76	97	98	96	95	95	99	92	67	97	97	81	95	92	93	92	95	93	92	92	95	86	88	99	
A06	gentiobiose	98	88	97	98	16	32	18	11	8	15	4	5	15	39	99	98	74	98	57	97	98	97	99	90	67	44	42	44	87	86	95	95	94	98	92	96	92	95	94	16	
A07	sucrose	83	85	10	20	10	77	13	9	97	14	6	26	12	96	98	98	94	97	97	96	97	97	97	91	92	41	52	47	74	71	91	98	97	96	91	96	90	88	90	98	
A08	D-turanose	99	44	9	46	21	38	19	10	7	15	5	6	11	20	98	98	92	96	94	74	69	77	82	79	95	56	52	52	66	79	81	98	97	90	86	93	80	95	94	14	
A09	stachyose	68	91	10	22	10	17	14	19	9	14	7	9	11	20	7	17	31	97	95	97	97	96	19	90	10	19	38	55	50	64	72	95	93	96	64	89	83	49	91	14	
A10	pos control	59	86	97	93	99	96	97	93	98	91	91	93	96	96	97	95	83	95	94	95	96	94	95	83	91	88	71	89	85	85	84	90	94	92	83	90	82	39	91	14	
A11	pH 6	29	89	96	90	99	46	97	87	96	89	92	93	95	94	95	94	81	93	94	92	92	91	93	79	86	83	61	86	80	84	82	87	92	89	82	57	85	38	90	100	
A12	pH 5	1	10	12	13	7	7	19	64	15	12	83	95	91	86	31	82	81	33	91	40	23	22	18	30	5	6	5	89	41	52	23	77	40	88	82	80	85	67	85	88	12
B01	D-raffinose	83	98	14	20	8	47	13	10	12	12	7	10	12	4	7	10	67	95	99	95	96	95	48	90	53	77	90	63	87	76	97	92	92	93	98	87	98	90	87	98	
B02	α-D-lactose	99	86	13	18	12	59	12	10	11	13	5	4	11	54	25	95	78	22	25	8	10	11	66	84	37	75	83	55	79	86	84	73	84	55	77	28	70	58	37	99	
B03	D-melibiose	99	97	14	27	17	34	14	12	9	14	3	3	12	86	38	92	69	93	97	94	95	94	86	85	96	81	75	52	77	64	93	75	90	84	90	71	92	92	82	99	
B04	β-methyl-D-glucoside	97	8	10	15	11	70	11	10	11	14	6	7	10	94	78	95	74	95	81	97	97	97	98	86	88	81	66	75	84	81	95	94	94	95	92	87	95	93	83	13	
B05	D-salicin	62	8	9	20	11	64	13	12	93	15	3	5	11	94	97	95	46	95	48	97	98	96	98	88	92	79	66	77	82	74	86	95	96	93	84	82	86	93	92	14	
B06	N-acetyl-D-glucosamine	99	90	96	98	16	10	98	11	10	13	10	9	11	96	89	96	46	21	22	95	95	96	98	87	85	92	62	90	89	86	96	97	96	96	93	89	86	89	88	13	
B07	N-acetyl-β-D-mannosamine	29	39	9	34	23	4	16	10	9	13	5	12	87	9	69	49	27	14	60	68	73	92	72	81	62	62	44	77	54	74	78	87	76	73	41	43	4	89	13		
B08	N-acetyl-D-galactosamine	29	97	98	99	12	9	98	98	98	14	3	4	11	95	89	90	57	19	22	5	8	9	33	73	3	50	32	55	50	68	56	49	78	49	49	23	35	30	35	13	
B09	N-acetyl neuraminic acid	99	97	7	9	10	5	12	11	8	14	5	5	11	75	2	4	6	87	0	4	7	5	22	0	2	0	2	13	18	28	37	9	59	9	25	0	0	0	3	12	
B10	1% NaCl	7	83	55	83	99	23	19	91	92	94	91	91	93	93	95	93	91	91	93	92	92	91	95	87	93	93	65	90	87	87	89	89	93	82	87	85	82	98	88	9	
B11	4% NaCl	6	10	9	13	22	4	18	10	11	73	21	49	83	81	58	92	84	85	85	87	88	87	93	84	92	42	50	76	82	83	77	76	88	84	80	82	83	97	83	8	
B12	8% NaCl	6	10	20	13	9	5	14	11	16	11	6	4	10	7	18	62	84	12	37	90	89	86	94	82	91	5	89	72	69	81	79	77	88	90	80	82	87	97	74	13	
C01	α-D-glucose	96	99	99	98	46	68	83	90	95	13	79	61	94	93	97	98	96	96	93	95	96	98	84	96	96	52	84	97	97	89	96	96	96	96	87	94	92	92	21		
C02	D-mannose	98	99	99	98	46	82	91	94	91	16	70	38	96	92	94	93	78	90	95	14	20	19	30	82	84	81	78	37	59	64	83	59	80	55	81	33	82	81	31	15	
C03	D-fructose	98	92	11	53	23	80	19	95	98	15	22	14	89	92	83	92	67	91	94	94	95	94	97	77	96	83	38	65	87	68	88	80	93	87	91	71	74	92	87	13	
C04	D-galactose	99	88	99	99	18	9	22	97	80	15	84	64	96	95	95	93	95	91	89	85	85	86	92	85	94	77	75	65	79	93	92	78	92	89	87	74	96	93	85	99	
C05	3-methyl glucose	15	16	10	44	19	6	25	12	11	14	3	6	13	80	43	49	67	52	48	15	16	17	56	78	73	33	14	39	71	76	74	32	74	70	69	15	31	83	57	14	
C06	D-fucose	12	2	11	14	19	4	23	13	16	16	8	15	67	75	97	91	71	44	73	9	7	11	66	76	84	70	69	58	77	74	70	62	79	60	62	47	76	75	71	99	
C07	L-fucose	25	96	17	36	22	5	27	13	95	19	6	90	13	79	95	31	54	42	73	13	13	15	55	80	44	53	49	44	56	68	68	32	77	55	51	23	43	57	41	16	
C08	L-rhamnose	99	97	10	38	46	5	24	12	12	16	95	3	12	94	95	33	57	71	87	24	20	21	64	68	46	15	6	27	46	64	51	12	64	29	69	11	15	31	37	97	
C09	inosine	23	8	7	22	17	4	94	98	13	15	48	43	12	93	42	81	18	71	39	90	94	91	95	68	75	25	2	14	46	61	51	9	51	39	41	0	1	1	57	98	
C10	1% Na-lactate	4	81	87	85	99	92	97	99	97	78	95	89	96	90	91	91	90	86	90	81	85	80	93	80	93	89	64	74	88	83	88	78	88	75	86	71	77	20	82	10	
C11	fusidic acid	13	14	9	13	19	3	17	93	11	13	92	42	89	7	5	4	4	4	4	5	4	4	3	5	6	5	1	2	3	3	4	4	5	3	3	5	4	5	4	19	
C12	D-serine	5	21	10	13	21	6	16	17	11	13	70	86	8	93	5	4	4	77	4	91	91	88	94	5	6	88	89	82	83	85	4	4	5	18	3	5	4	7	4	10	
D01	D-sorbitol	17	7	11	16	8	11	13	11	97	13	45	10	11	5	7	38	51	97	99	32	19	51	8	59	13	53	75	68	71	54	74	65	85	96	92	30	31	4	55	14	
D02	D-mannitol	20	11	11	20	12	6	13	98	98	13	38	11	98	93	91	92	74	91	96	95	95	94	98	79	96	50	49	39	66	68	78	73	88	82	89	52	90	88	76	13	
D03	D-arabitol	19	19	6	27	12	5	12	98	96	15	30	5	98	74	8	25	59	48	4	42	26	46	56	49	8	11	0	16	46	37	68	12	59	39							

Class Phylogenetic Clustering



	Sample	AED	KMA	ABG	SEH	TLH	VKK	RES	CNN	KLP	KLK	ARC	CJA	SAW	RNG	ANG	BMS	LMR	VLK	MIJ	TLH	JMR	KAM	KAR	CED	SJS	LEB	KET	MAL	MSS	SRB	AKS	KMJ	BNH	LAG	ECW	SRF	AHK	NLO	EKP	CMT	
	16S ID	Flavobacterium novum	Flavobacterium novum	Flavobacterium novum	Flavobacterium novum	Kaistella koreensis	Dyadobacter soli	Iodobacter fluvialis	Janthinebacterium lividum	Janthinebacterium lividum	Comamonas testosteroni	Pseudomonas lurida	Pseudomonas fragilis	Pseudomonas novum	Aeromonas salmonicida	Microbacterium maritimum	Frigoribacterium faeni	Dermaococcus nishinomiyaensis	Arthrobacter novum	Arthrobacter oryzae novum	Exiguobacterium indicum	Exiguobacterium indicum	Exiguobacterium indicum	Exiguobacterium indicum	Bacillus indicus	Bacillus indicus	Bacillus indicus	Bacillus indicus	Bacillus indicus	Bacillus indicus	Bacillus indicus	Bacillus indicus	Bacillus indicus	Bacillus indicus	Bacillus indicus	Bacillus indicus	Bacillus indicus	Bacillus indicus	Bacillus indicus	Bacillus indicus	Bacillus indicus	
E01	gelatin	35	98	97	97	100	10	14	68	91	14	10	8	12	98	30	21	92	92	82	97	98	98	98	85	94	99	100	99	99	99	88	94	94	89	86	95	93	4	87	15	
E02	glycyl-L-proline	94	95	95	87	97	4	100	98	95	15	7	6	98	95	45	28	76	58	81	26	28	40	34	69	0	75	42	50	69	54	49	46	75	57	64	28	63	93	60	14	
E03	L-alanine	20	95	32	3	96	4	91	98	95	94	60	59	96	96	16	77	2	92	91	90	88	92	93	63	86	77	56	75	74	58	63	67	90	52	64	61	50	72	83	17	
E04	L-arginine	97	96	80	98	23	4	93	13	9	16	80	55	18	97	13	48	69	92	88	50	53	51	61	72	72	83	78	75	77	74	76	73	87	78	81	69	76	90	88	16	
E05	L-aspartic acid	38	96	96	98	100	4	99	98	99	99	90	73	97	96	44	82	76	94	79	18	25	29	59	73	42	81	62	86	87	88	81	93	94	93	83	84	85	95	94	16	
E06	L-glutamic acid	99	96	98	97	100	5	99	99	98	99	97	86	98	97	55	87	86	95	82	60	56	66	81	69	88	85	59	87	86	89	84	90	96	93	83	82	86	94	94	16	
E07	L-histidine	29	55	41	24	32	4	99	99	10	99	98	85	88	97	3	12	33	93	87	11	17	15	34	32	9	67	49	79	69	76	70	73	84	80	64	61	70	58	83	99	
E08	L-pyroglutamic acid	22	20	14	30	15	4	16	15	8	100	82	67	98	60	32	22	62	92	87	18	16	20	68	63	85	72	42	63	59	61	63	78	89	84	64	64	67	85	87	14	
E09	L-serine	10	94	92	61	13	4	98	98	82	21	96	88	98	96	13	79	26	88	72	41	48	64	88	60	82	56	69	77	59	64	41	53	79	67	49	44	45	59	73	99	
E10	lincomycin	15	85	91	86	49	92	99	96	96	98	89	90	95	88	5	4	4	4	4	5	4	4	3	5	6	5	1	2	3	3	71	71	83	74	62	5	74	87	80	20	
E11	guanidine HCl	11	80	10	13	12	2	17	53	43	98	83	84	69	90	67	79	4	65	73	86	86	84	87	5	6	85	51	74	74	79	14	16	26	3	3	5	4	5	4	18	
E12	niaproof 4	3	10	15	13	9	8	16	14	16	94	94	81	94	5	4	4	4	4	4	5	4	4	6	5	6	5	87	2	3	3	4	4	5	3	3	5	4	6	4	16	
F01	pectin	46	86	23	12	13	47	11	13	24	13	12	8	11	92	77	95	98	90	91	82	92	92	87	87	94	59	85	52	46	37	89	93	96	92	91	89	93	89	89	14	
F02	D-galacturonic acid	32	96	98	99	72	22	21	18	14	17	96	64	97	61	64	27	64	57	66	28	37	38	69	78	55	75	72	84	69	76	65	89	86	89	66	74	80	50	67	16	
F03	L-galacturonic acid lactone	13	2	11	5	8	5	12	12	11	15	7	5	11	5	2	2	11	3	6	1	3	1	13	0	1	15	42	39	34	13	44	40	82	1	46	3	1	0	13	12	
F04	D-gluconic acid	32	26	17	33	15	6	98	25	11	99	88	92	98	96	96	95	71	96	89	96	98	96	97	83	94	90	75	92	87	95	81	93	92	94	81	78	80	91	92	13	
F05	D-glucuronic acid	99	71	72	96	28	27	24	15	44	19	98	98	97	64	44	35	90	95	76	17	19	21	67	83	67	79	89	77	86	92	72	82	94	93	89	86	95	93	92	18	
F06	glucuronamide	30	36	24	31	43	9	31	35	15	38	14	10	44	13	41	17	67	21	25	12	10	6	26	72	37	53	69	70	71	54	56	65	87	74	62	66	60	73	61	33	
F07	muicic acid	33	22	15	23	12	4	13	11	8	98	97	52	97	23	21	15	33	34	48	12	12	14	48	60	47	47	49	63	50	64	49	56	84	74	66	52	65	24	63	14	
F08	quinic acid	23	27	19	34	100	5	15	11	9	16	100	100	97	58	20	23	71	92	91	19	19	23	60	68	37	56	38	68	40	61	54	70	87	84	59	71	67	90	90	13	
F09	D-saccharic acid	30	13	14	18	11	4	7	10	8	99	95	83	97	21	2	7	18	29	28	3	6	5	10	49	10	11	9	42	12	7	24	29	71	62	39	26	33	5	10	12	
F10	vancomycin	18	90	95	90	16	58	17	87	14	93	87	89	97	93	5	4	4	4	4	5	4	4	5	5	5	6	5	1	2	3	3	4	4	5	3	3	5	4	5	4	14
F11	tetrazolium violet	76	100	99	100	49	60	86	58	99	99	98	99	100	98	22	18	4	9	11	12	14	8	28	5	19	5	3	2	3	3	4	4	9	6	3	5	4	29	4	71	
F12	tetrazolium blue	49	100	99	100	49	90	100	100	100	98	99	99	80	98	19	20	4	6	9	7	11	6	23	6	17	5	85	2	3	3	4	4	8	3	3	5	4	25	4	50	
G01	p-hydroxy-phenylacetic acid	9	5	12	1	8	10	8	10	16	96	12	8	10	3	95	3	41	96	94	21	13	18	7	27	5	53	80	79	69	61	63	62	93	37	56	49	11	1	15	13	
G02	methyl pyruvate	18	94	15	28	5	5	98	11	83	75	12	15	60	92	3	1	0	89	0	36	1	65	81	0	6	0	87	0	86	37	72	82	85	90	75	87	85	69	82	97	
G03	D-lactic acid methyl ester	24	23	19	33	12	5	13	13	12	18	7	3	12	17	11	13	78	36	44	23	22	23	59	73	31	81	72	75	90	76	87	78	94	78	77	69	78	4	79	13	
G04	L-lactic acid	25	19	10	3	15	5	12	98	97	100	77	14	11	44	76	9	82	94	91	16	19	18	56	76	8	91	87	93	89	94	86	90	95	94	81	87	80	83	95	17	
G05	citric acid	8	31	31	46	15	4	7	98	94	98	99	100	98	91	2	97	0	97	96	15	25	20	60	2	71	79	66	87	89	94	84	87	96	94	86	86	83	97	95	99	
G06	α-keto-glutaric acid	33	19	19	36	16	4	99	97	96	98	36	23	92	24	4	47	43	96	44	17	30	37	43	66	65	90	59	87	82	81	80	92	78	69	76	76	76	34	83	16	
G07	D-malic acid	24	13	19	36	11	4	15	18	60	99	7	43	13	1	5	34	54	59	49	8	17	14	50	44	9	70	72	81	74	79	70	78	89	80	64	82	65	13	71	15	
G08	L-malic acid	55	24	19	47	13	5	98	98	97	99	94	99	97	96	88	96	69	96	92	21	21	27	47	74	60	85	56	87	82	86	78	89	94	90	81	91	85	97	96	19	
G09	bromo-succinic acid	9	6	6	2	20	4	13	25	23	80	14	8	27	89	2	91	9	84	85	1	0	0	0	0	0	44	42	58	53	61	54	53	83	62	51	64	45	87	74	13	
G10	nalidixic acid	15	26	13	13	41	5	17	92	21	12	29	71	12	4	93	86	69	87	88	5	4	42	25	5	6	5	1	66	26	19	4	4	5	3	5	4	9	4	17		
G11	KCl	4	10	9	13	39	4	16	12	11	83	4	27	8	40	93	94	4	52	82	87	90	89	90	83	87	40	64	75	70	72	76	83	90	88	77	82	80	98	87	10	
G12	K-tellurite	9	13	20	14	87	22	17	91	50	14	97	96	84	7	95	95	84	95	81	94	95	94	95	87	92	86	85	87	85	86	89	89	94	92	87	88	87	66	92	21	
H01	tween-40	6	78	89	93	14	12	93	21	40	42	20	20	13	97	61	95	98	71	90	98	96	96	97	86	97	99	99	98	100	99	92	99	98	97	96	87	92	96	96	13	
H02	γ-amino-butyric acid	17	12	18	14	9	5	15	11	17	8	88	72	97	2	8	2	92	99	96	17	13	18	5	52	26	90	72	91	87	91	84	94	90	88	92	90	94	92	95	97	
H03	α-hydroxy-butyric acid	9	10	15	20	8	5	12	13	18	95	12	4	13	2	83	4	99	89	91	2	1	1	3	1	4	88	96	86	93	76	87	89	98	96	86	91	93	23	94	98	
H04	β-hydroxy-D,L-butyric acid	1																																								

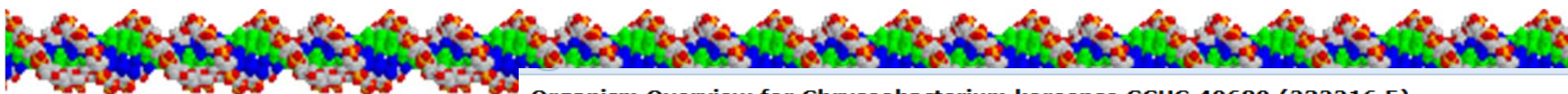
Research



Biolog GenIII plates used to compare novel species candidates to closest relatives.

Organism	well contents	Pedobacter					Organism	well contents	Pedobacter				
		sp.novum	agri	alluvionis	borealis	yonginense			sp.novum	agri	alluvionis	borealis	yonginense
		R20-19	DSM 19486	DSM 19624	DSM 19626	R20-25			R20-19	DSM 19486	DSM 19624	DSM 19626	R20-25
A01	neg control	23	27	25	16	17	E01	gelatin	92	97	98	99	87
A02	dextrin	99	99	98	100	99	E02	glycyl-L-proline	50	84	82	77	93
A03	D-maltose	99	98	98	99	92	E03	L-alanine	8	15	16	7	17
A04	D-trehalose	96	97	97	55	84	E04	L-arginine	8	10	9	8	6
A05	D-cellobiose	98	95	97	94	97	E05	L-aspartic acid	52	95	94	64	87
A06	gentiobiose	98	96	97	96	93	E06	L-glutamic acid	61	95	95	98	99
A07	sucrose	95	98	98	15	71	E07	L-histidine	10	12	27	13	16
A08	D-turanose	96	94	97	42	83	E08	L-pyrogutamic acid	8	7	9	8	7
A09	stachyose	93	24	97	16	29	E09	L-serine	13	59	38	9	55
A10	pos control	97	98	97	99	98	E10	lincomycin	10	10	10	12	12
A11	pH 6	97	97	97	97	98	E11	guanidine HCl	11	12	12	11	10
A12	pH 5	18	13	15	15	16	E12	niaproof 4	12	11	14	16	17
B01	D-raffinose	88	64	97	15	43	F01	pectin	95	97	69	21	96
B02	α -D-lactose	97	88	96	96	77	F02	D-galacturonic acid	93	97	97	13	99
B03	D-melibiose	94	86	96	97	65	F03	L-galacturonic acid lactone	8	8	10	10	8
B04	β -methyl-D-glucoside	93	75	96	18	84	F04	D-gluconic acid	8	9	14	11	8
B05	D-salicin	97	85	97	12	83	F05	D-glucuronic acid	16	94	94	60	99
B06	N-acetyl-D-glucosamine	81	93	96	38	48	F06	glucuronamide	11	15	17	16	16
B07	N-acetyl- β -D-mannosamine	14	10	14	9	9	F07	mucic acid	8	6	9	6	7
B08	N-acetyl-D-galactosamine	10	21	66	81	7	F08	quinic acid	8	6	9	8	7
B09	N-acetyl neuraminic acid	12	6	10	7	7	F09	D-saccharic acid	8	6	9	8	7
B10	1% NaCl	94	96	93	57	96	F10	vancomycin	93	30	95	97	95
B11	4% NaCl	18	21	12	9	11	F11	tetrazolium violet	98	50	99	96	35
B12	8% NaCl	24	15	18	25	15	F12	tetrazolium blue	99	100	99	100	98
C01	α -D-glucose	99	98	97	100	98	G01	p-hydroxy-phenylacetic acid	12	14	14	16	12
C02	D-mannose	97	95	96	99	95	G02	methyl pyruvate	9	24	9	10	14
C03	D-fructose	62	83	96	53	14	G03	D-lactic acid methyl ester	8	11	9	14	9
C04	D-galactose	98	97	10	100	97	G04	L-lactic acid	8	8	9	10	8
C05	3-methyl glucose	8	6	9	6	4	G05	citric acid	8	8	9	10	9
C06	D-fucose	9	9	11	8	5	G06	α -keto-glutaric acid	8	6	9	8	7
C07	L-fucose	17	14	49	38	8	G07	D-malic acid	8	6	9	10	8
C08	L-rhamnose	90	92	95	68	10	G08	L-malic acid	90	7	14	9	7
C09	inosine	10	6	10	8	7	G09	bromo-succinic acid	37	6	9	7	6
C10	1% Na-lactate	91	93	91	31	95	G10	nalidixic acid	94	96	94	96	97
C11	fusidic acid	10	9	11	10	10	G11	LiCl	10	11	11	11	12
C12	D-serine	18	16	18	13	13	G12	K-tellurite	24	21	21	20	28
D01	D-sorbitol	16	18	18	12	10	H01	tween-40	22	75	60	25	37
D02	D-mannitol	10	10	11	10	8	H02	γ -amino-butyric acid	8	9	10	16	14
D03	D-arabitol	8	9	11	7	5	H03	α -hydroxy-butyric acid	8	9	9	15	11
D04	myo-inositol	9	6	10	8	5	H04	β -hydroxy-D,L-butyric acid	8	6	9	12	13
D05	glycerol	8	8	9	6	5	H05	α -keto-butyric acid	8	6	9	12	8
D06	D-glucose-6-PO4	9	10	12	12	11	H06	acetoacetic acid	11	6	15	10	7
D07	D-fructose-6-PO4	9	11	14	9	13	H07	propionic acid	8	7	9	12	11
D08	D-aspartic acid	8	6	9	7	6	H08	acetic acid	22	66	30	17	14
D09	D-serine	19	22	10	6	6	H09	formic acid	8	6	10	11	11
D10	troleandomycin	10	10	15	12	12	H10	aztreonam	96	97	96	99	98
D11	rifamycin SV	12	11	13	21	11	H11	Na-butyrate	12	14	16	22	18
D12	minocycline	14	14	16	14	15	H12	Na bromate	15	13	14	18	21

Compare GenIII Results to Rapid Annotation with Subsystem Technology (RAST)



Subsystem category expansion show individual subsystems, which can be compared to utilization and resistance patterns.

Organism Overview for *Chryseobacterium koreense* CCUG 49689 (232216.5)

Genome	Chryseobacterium koreense CCUG 49689 (Taxonomy ID: 232216)
Domain	Bacteria
Taxonomy	Bacteria; Bacteroidetes/Chlorobi group; Bacteroidetes; Flavobacteriia; Flavobacteriales; Flavobacteriaceae; Chryseobacterium; Chryseobacterium koreense CCUG 49689
Neighbors	View closest neighbors
Size	3,199,137 bp
Number of Contigs (with PEGs)	578
Number of Subsystems	290
Number of Coding Sequences	3677
Number of RNAs	40

For each genome we offer a wide set of information to browse

Browse Compare Download Annotate

Browse through the features of [Chryseobacterium koreense CCUG 49689](#) both graphically and through a table. Both allow quick navigation and filtering for features of your interest. Each feature is linked to its own detail page.

Click [here](#) to get to the Genome Browser

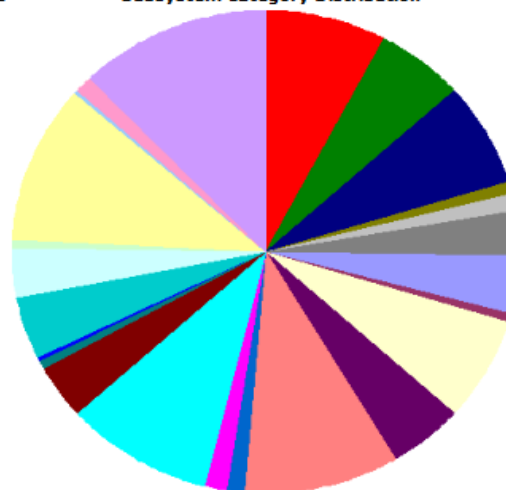
Subsystem Information

Subsystem Statistics Features in Subsystems

Subsystem Coverage



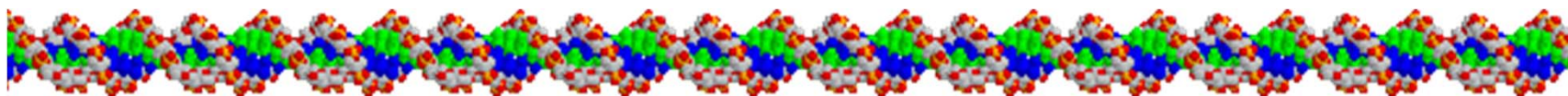
Subsystem Category Distribution



Subsystem Feature Counts

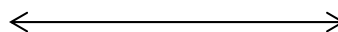
- ☐ Cofactors, Vitamins, Prosthetic Groups, Pigments (1)
- ☐ Cell Wall and Capsule (90)
- ☐ Virulence, Disease and Defense (112)
- ☐ Potassium metabolism (12)
- ☐ Photosynthesis (0)
- ☐ Miscellaneous (17)
- ☐ Phages, Prophages, Transposable elements, Plasm
- ☐ Membrane Transport (65)
- ☐ Iron acquisition and metabolism (6)
- ☐ RNA Metabolism (115)
- ☐ Nucleosides and Nucleotides (76)
- ☐ Protein Metabolism (164)
- ☐ Cell Division and Cell Cycle (16)
- ☐ Motility and Chemotaxis (0)
- ☐ Regulation and Cell signaling (22)
- ☐ Secondary Metabolism (1)
- ☐ DNA Metabolism (157)
- ☐ Regulons (0)
- ☐ Fatty Acids, Lipids, and Isoprenoids (58)
- ☐ Nitrogen Metabolism (10)
- ☐ Dormancy and Sporulation (5)
- ☐ Respiration (68)
- ☐ Stress Response (52)
- ☐ Metabolism of Aromatic Compounds (11)
- ☐ Amino Acids and Derivatives (171)
- ☐ Sulfur Metabolism (6)
- ☐ Phosphorus Metabolism (16)
- ☐ Carbohydrates (196)

Carbohydrate Utilization RAST Subsystems



Subsystem Feature	Count
Carbohydrates	196
Central carbohydrate metabolism	87
Methylglyoxal Metabolism	7
Pyruvate metabolism II: acetyl-CoA, acetogenesis from pyruvate	10
Pyruvate Alanine Serine Interconversions	4
Glycolysis and Gluconeogenesis	14
Entner-Doudoroff Pathway	11
Dehydrogenase complexes	13
TCA Cycle	15
Pentose phosphate pathway	8
Pyruvate metabolism I: anaplerotic reactions, PEP	5
Aminosugars	0
Di- and oligosaccharides	6
Maltose and Maltodextrin Utilization	6
Glycoside hydrolases	0
One-carbon Metabolism	37
Serine-glyoxylate cycle	31
One-carbon metabolism by tetrahydropterines	6
Organic acids	0
Fermentation	25
Butanol Biosynthesis	11
Acetyl-CoA fermentation to Butyrate	14
CO₂ fixation	0
Sugar alcohols	0
Carbohydrates - no subcategory	0
Polysaccharides	15
Glycogen metabolism	7
Cellulosome	8
Monosaccharides	28
Mannose Metabolism	6
D-ribose utilization	2
Deoxyribose and Deoxynucleoside Catabolism	6
D-Galacturonate and D-Glucuronate Utilization	14

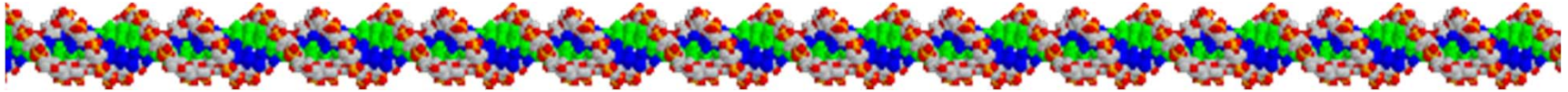
Correlation ?



	1	2	3	4	5	6	7	8	9	10	11	12
A												
B												
C												
D												
E												
F												
G												
H												

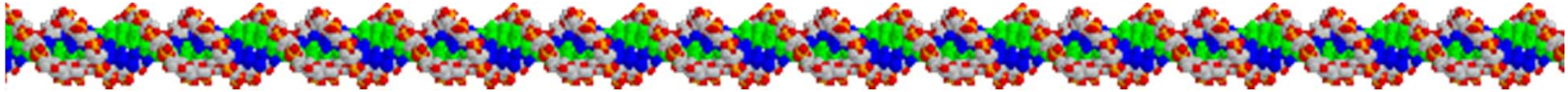
BiOLOG

Biolog GenIII Plates

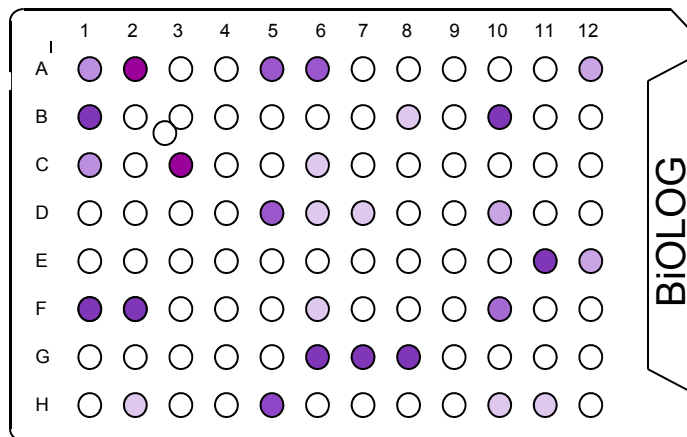


- Identification
- Metabolic profiles of related species
- Genotype vs. Phenotype studies

Bilog GenIII plates in the Undergraduate Laboratory



- FUN – get to use multi-channel pipettor
- Less expensive and provides more info than API tests
 - ~\$10 includes GenIII plate, BUG+Blood plate, inoculating fluid, tips, reservoir
- Web-based database search tool in planning stages
→ ASMCUE 2014



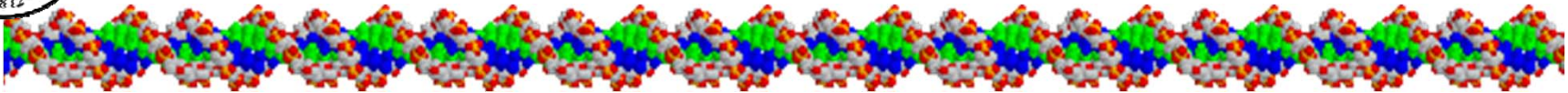
Biolog GenIII Plate

Score from 0-5

	1	2	3	4	5	6	7	8	9	10	11	12
A	negative control	dextrin	D-maltose	D-trehalose	D-cellobiose	gentiobiose	sucrose	D-turanose	stachyose	positive control	pH 6	pH 5
B	D-raffinose	α-D-lactose	D-melibiose	β-methyl-D-glucoside	D-salicin	N-acetyl-D-glucosamine	N-acetyl-D-mannosamine	N-acetyl-D-glucosamine	N-acetylneuraminic acid	1% NaCl	4% NaCl	8% NaCl
C	α-D-glucose	D-mannose	D-fructose	D-galactose	3-methyl glucose	D-fucose	L-fucose	L-rhamnose	inosine	1% Na-lactate	fusidic acid	D-serine
D	D-sorbitol	D-mannitol	D-arabitol	myo-inositol	glycerol	D-glucose-6-PdA	D-fructose-6-PdA	D-aspartic acid	D-serine	Troleandomycin	rifamycin SV	minocycline
E	gelatin	glycyl-L-proline	L-alanine	L-arginine	L-aspartic acid	L-glutamic acid	L-histidine	L-pyrogutamic acid	L-serine	lincomycin	guanidine HCl	niaproof 4
F	pectin	D-galacturonic acid	L-galacturonic acid lactone	D-gluconic acid	D-glucuronic acid	glucuronamide	mucic acid	quinic acid	D-saccharic acid	vancomycin	tetracollum violet	tetracollum blue
G	phidrox-phenylisetic acid	methyl pyruvate	D-lactic acid methyl ester	L-lactic acid	citric acid	α-keto-glutaric acid	D-malic acid	L-malic acid	bromo-succinic acid	nalidixic acid	LiCl	K-tellurite
H	tween-40	γ-amino-butyric acid	α-hydroxy-butyric acid	β-hydroxy-butyric acid	α-keto-butyric acid	acetoacetic acid	propionic acid	acetic acid	formic acid	aztreonam	Na-butyrate	Na bromate



Questions ?



From left to right:

Back: Dr. Newman, Andrew Gale ('15), Dillon Snyder ('14), Tom Sontag ('14), Logan Mariano ('13),
Me, Clark Thompson ('13)

Front: Jessica Hoffman ('15), and Jessica Lehman ('13)