

Personalized bacteriophage therapy outcomes for 100 consecutive cases: a multicentre, multinational, retrospective observational study

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Supplementary Table 1 | Overview of the first 100 consecutive bacteriophage therapy cases facilitated by a Belgian consortium, displayed in chronological order

[illegible]

Supplementary Table 2 | Overview of the first 100 consecutive bacteriophage therapy cases facilitated by a Belgian consortium, encoded, and with eradication predictions added

CASENUM	INDICATI	TARGET	OTHERSP	ABRPROF	APPROUTE	ABCUNCOM	CLINSETT	ADVREACT	PTABORT	C1	ERADIC	PREDICTED ERADIC
1	Boned	SA	Yes	MDR	IL	Yes	H	No	No	Yes	Yes	yes
2	Boned	SA	No	UDR	IL	Yes	H	No	No	No	Yes	yes
3	LRTI	PA	Yes	MDR	Nebul	Yes	H	No	Yes	No	Yes	yes
4	Boned	PA	No	MDR	Topical	Yes	H	No	No	Yes	Yes	yes
5	Other	EC	No	MDR	Rectal	Yes	A	No	No	Yes	Yes	yes
6	LRTI	EC+PM	No	MDR	Nebul	Yes	H	No	No	Yes	Yes	yes
7	URTI	PA	No	UDR	Nasal	No	A	No	No	Yes	Yes	yes
8	LRTI+UTI	PA	No	MDR	Nebul	Yes	H	No	No	Yes	Yes	yes
9	Boned	KP	No	MDR	IL	Yes	H	No	No	Yes	Yes	yes
10	URTI	SA	No	UDR	Nasal	No	A	No	No	Yes	Yes	yes
11	LRTI	PA	No	MDR	Nebul+Oral	No	H	Yes	No	Yes	No	No
12	LRTI	PA	No	UDR	Nebul	No	H	No	No	Yes	Yes	yes
13	SSTI+BSI	PA	No	MDR	IV	No	H	No	No	Yes	Yes	yes
14	SSTI	PA+SA	No	MDR	Topical	No	H	No	No	No	No	No
15	OPI	PA	No	UDR	IL	Yes	H	No	No	Yes	Yes	yes
16	LRTI	AX	No	MDR	Nebul+IL	No	H	No	No	Yes	Yes	yes
17	LRTI	PA	No	MDR	Nebul+Oral	Yes	H	No	No	Yes	Yes	yes
18	SSTI	PA	No	MDR	Topical	No	H	No	No	Yes	Yes	yes
19	SSTI	AB	Yes	MDR	Topical	Yes	H	No	No	Yes	Yes	yes
20	Abdl+BSI	PA	No	MDR	IL+IV	Yes	H	Yes	No	Yes	Yes	yes
21	OPI	SA	Yes	UDR	IL	Yes	H	No	No	Yes	Yes	yes
22	Boned	PA+SE	Yes	MDR	IL	Yes	H	No	No	Yes	Yes	yes
23	Boned	SA	Yes	UDR	IL	Yes	H	No	No	Yes	Yes	yes
24	Boned	PA+SE	No	MDR	IL	Yes	H	No	No	Yes	Yes	yes
25	URTI	SA	Yes	UDR	Nasal	No	A	No	No	Yes	No	No
26	OPI+BSI	PA	No	MDR	IL+IV	Yes	H	No	No	Yes	Yes	yes
27	OPI	PA	No	MDR	IL	Yes	H	No	Yes	Yes	Yes	yes
28	LRTI	AX	No	MDR	Nebul	Yes	H	No	No	No	No	yes
29	LRTI	AX	No	MDR	Nebul	Yes	H	No	No	Yes	No	yes
30	PA+SA	PA	No	MDR	Nasal	No	A	No	No	No	No	No
31	URTI	SA	No	UDR	Nasal	No	A	Yes	Yes	Yes	No	No
32	URTI	SA	No	UDR	Nasal	No	A	No	No	No	No	No
33	LRTI	PA+MA	No	UDR	Nebul	No	A	No	No	No	No	No
34	SSTI+BSI	PA	No	MDR	IV	Yes	H	No	No	Yes	Yes	yes
35	SSTI	PA+SA	No	UDR	Topical	No	H	No	Yes	No	No	No
36	SSTI	PA+SA	No	MDR	Topical	Yes	H	No	No	No	No	yes
37	OPI	SE	MDR	IL+Topical	H	Yes	H	Yes	No	Yes	No	No
38	URTI	PA	Yes	MDR	Nasal	No	A	No	No	No	No	No
39	Boned	SE	Yes	UDR	IL	Yes	H	Yes	No	Yes	Yes	yes
40	Boned	PA+SA+BF	No	UDR	IL	No	H	No	No	No	No	No
41	Boned	PA+SA+EF	Yes	UDR	IL	Yes	H	No	No	Yes	No	yes
42	Boned	EF	No	UDR	IL	Yes	H	Yes	No	Yes	Yes	yes
43	Abdl	EFUM	Yes	UDR	IV	Yes	H	No	No	Yes	Yes	yes
44	LRTI+UTI	KP	No	MDR	Nebul+BI	Yes	H	No	Yes	No	Yes	yes
45	URTI	AX	No	UDR	Nasal	No	A	No	No	No	No	No
46	LRTI	SA+SM	Yes	MDR	Nebul	No	H	No	No	Yes	No	No
47	LRTI	MA	Yes	UDR	Nebul	No	H	No	No	Yes	No	No
48	Other+BSI	PA	No	UDR	IV	Yes	H	No	No	Yes	Yes	yes
49	LRTI	PA	No	UDR	Nebul	Yes	H	No	No	Yes	Yes	yes
50	SSTI	PA	No	UDR	Topical	No	H	No	No	Yes	Yes	yes
51	LRTI	PA	No	UDR	Nebul	No	A	No	No	No	No	No
52	Boned	PA+SA+EF	No	UDR	IL	Yes	H	No	No	Yes	Yes	yes
53	LRTI	PA	No	MDR	Nebul	No	A	No	No	Yes	Yes	yes
54	LRTI	PA	No	MDR	Nebul	Yes	H	No	No	Yes	No	No
55	OPI	SE	No	UDR	IL+IV	No	H	No	No	No	No	No
56	Other	PA	No	MDR	Topical	Yes	H	No	No	Yes	Yes	yes
57	LRTI	PA	No	MDR	Nebul	Yes	H	No	No	Yes	Yes	yes
58	SSTI	SA	No	UDR	Topical	Yes	H	Yes	Yes	Yes	Yes	yes
59	SSTI	SA	No	UDR	Topical	Yes	H	No	No	Yes	Yes	yes
60	SA	SA	No	UDR	Topical	Yes	H	No	No	Yes	Yes	yes
61	SSTI	SA	No	UDR	Topical	Yes	H	No	No	Yes	Yes	yes
62	SSTI	SA+SHOM	No	UDR	Topical	Yes	H	No	No	Yes	Yes	yes
63	SSTI	SA	No	UDR	Topical	Yes	H	No	No	No	No	No
64	Abdl	PA	No	MDR	IL	No	A	No	Yes	No	Yes	No
65	Boned	SA	No	MDR	IL	Yes	H	No	No	Yes	Yes	yes
66	LRTI	MA	No	UDR	Nebul+IV	Yes	H+A	No	No	No	No	yes
67	LRTI	PA	No	MDR	Nebul	Yes	H	No	No	Yes	Yes	yes
68	Abdl	KP	No	MDR	IL	Yes	H	No	No	Yes	Yes	yes
69	Abdl	KP	No	MDR	IL	Yes	H	No	Yes	No	No	yes
70	LRTI+URTI	SA	No	UDR	Nasal	No	A	No	No	Yes	No	No
71	LRTI	PA	No	UDR	Nebul	No	A	No	No	Yes	Yes	yes
72	SSTI	SA	No	MDR	Topical	Yes	H	No	No	Yes	Yes	yes
73	SSTI	SA	No	UDR	Topical	No	H	No	No	No	No	No
74	SSTI+BSI	PA	No	MDR	IV	Yes	H	No	No	Yes	Yes	yes
75	LRTI	PA	No	MDR	Nebul+IV	Yes	H	No	No	Yes	Yes	yes
76	LRTI	PA	No	MDR	Nebul	Yes	H	No	No	No	No	yes
77	URTI	SA+AX	No	MDR	Nasal	No	A	No	No	Yes	No	No
78	URTI	SA	No	UDR	Nasal	No	A	No	No	Yes	No	No
79	Other	PA	No	MDR	IV	Yes	H	No	Yes	Yes	No	yes
80	LRTI	PA	No	UDR	Nebul	No	A	No	No	Yes	No	No
81	SSTI	PA	No	MDR	IV	Yes	H	No	No	Yes	Yes	yes
82	LRTI	PA	No	MDR	Nebul	Yes	H	No	No	Yes	Yes	yes
83	SSTI	SA	No	UDR	Topical	Yes	H	No	No	Yes	Yes	yes
84	SSTI	SA	No	UDR	Topical	Yes	H	No	No	Yes	Yes	yes
85	SSTI	SA	Yes	UDR	Topical	Yes	H	No	No	Yes	Yes	yes
86	SSTI	SA	No	MDR	Topical	Yes	H	No	No	Yes	Yes	yes
87	Other+BSI	PA	No	MDR	IV	Yes	H	No	No	Yes	No	yes
88	Boned	EC+EF	No	MDR	IL+IV	Yes	H	Yes	No	Yes	No	yes
89	Boned	SA	No	UDR	IL	Yes	H	No	No	No	No	yes
90	URTI	SA	No	UDR	Nasal	No	A	No	No	Yes	No	No
91	LRTI	PA	No	MDR	Nebul+IV	Yes	H	No	No	Yes	No	yes
92	SSTI+LRTI	SA+PA+SM	No	MDR	IL+Topical+IV+Nebul	Yes	H	No	No	Yes	Yes	yes
93	LRTI	PA	Yes	MDR	Nebul+IL	Yes	H	No	Yes	No	Yes	yes
94	Abdl+BSI	EFUM	Yes	MDR	IL+IV	Yes	H	No	No	Yes	Yes	yes
95	SSTI	PA	No	UDR	Topical	Yes	H	No	No	Yes	Yes	yes
96	SSTI+BSI	PA	Yes	MDR	Topical	Yes	H	No	Yes	No	Yes	yes
97	Boned	SA	Yes	UDR	Topical	Yes	H	No	No	Yes	Yes	yes
98	Other+BSI	SA	No	UDR	IV	Yes	H	No	No	Yes	Yes	yes
99	URTI	SA	No	UDR	Nasal	Yes	A	Yes	No	Yes	Yes	yes
100	SSTI	SA	No	UDR	IL	Yes	H	No	No	Yes	Yes	yes

A, ambulatory; Abdl, abdominal infection; AB, *Acinetobacter baumannii*; AX, *Achromobacter xylosoxidans*; BF, *Bacteroides fragilis*; BI, bladder infection; Boned, bone infection; BSI, bloodstream infection; EC, *Escherichia coli*; EF, *Enterococcus faecalis*; EFUM, *Enterococcus faecium*; H, hospital; IL, intraleisonal; IV, intravenous; KP, *Klebsiella pneumoniae*; LRTI, lower respiratory tract infection; MA, *Mycobacterium abscessus*; MDR, multidrug resistant; Nebul, nebulization; OPI, orthopedic prosthesis infection; PA, *Pseudomonas aeruginosa*; PM, *Proteus mirabilis*; SA, *Staphylococcus aureus*; SE, *Staphylococcus epidermidis*; SHOM, *Staphylococcus hominis*; SM, *Stenotrophomonas maltophilia*; SSSI, skin and soft tissue infection; UDR, usual drug resistance; URTI, upper respiratory tract infection; UTI, urinary tract infection.

Variable	Description
CASENUM	Patient case number
INDICATI	Infection type
TARGET	Bacterial species targeted by bacteriophage therapy
OTHERSP	Other species present (not targeted)
ABRPROF	Antibiotics resistance profile
APPROUTE	Application route
ABCUNCOM	Concomitant standard of care antibiotics treatment
CLINSETT	Ambulatory or hospitalized
ADVREACT	Reported adverse reaction
PTABORT	Bacteriophage therapy abortion
C1	Clinical improvement
ERADIC	Eradication of the targeted bacteria
PREDICTED ERADIC	Predicted eradication (green fill color for correct prediction)

Supplementary Table 3 | Characteristics of the 26 bacteriophages used, individually or in combination, in the present 100 consecutive bacteriophage therapy cases

Bacterial host species	Name	Classification (family, genus)	Morphotype	Genome accession #	Genome size (kb)	Predicted lifestyle	Origin	Source	Propagation strain used in production	# patients treated
<i>Pseudomonas aeruginosa</i>	14-1	<i>Caudoviricetes, Pbunavirus</i>	Myovirus	NC_011703	66.2	SL	SIGSIM and KU Leuven	Sewage water, Regensburg, 2000	573	22
	PNM	<i>Autographiviridae, Phikmvirus</i>	Podovirus	OP292288	42.7	SL	EIBMV	Mtkvari River, Tbilisi, 1999	573	21
	PT07	<i>Caudoviricetes, Pakpunavirus</i>	Myovirus	OQ850183	94.7	SL	EIBMV	Lake Ku, Tbilisi, 1999	573	18
	4029	<i>Schitoviridae, Litunavirus</i>	Podovirus	ON815901	72.0	SL	University of Lausanne	Sewage water, Lausanne, 2015	PAO1	1
	4032	<i>Schitoviridae, Litunavirus</i>	Podovirus	ON815902	72.0	SL	University of Lausanne	Sewage water, Lausanne, 2015	ATCC15442	1
	4034	<i>Schitoviridae, Litunavirus</i>	Podovirus	ON815903	72.0	SL	University of Lausanne	Sewage water, Lausanne, 2015	PAO1	1
	4P	<i>Caudoviricetes, Pbunavirus</i>	Myovirus	OQ872152	66.1	SL	QAMH	Congo Stream, Congo, 2016	573	2
	DP1	<i>Caudoviricetes, Pbunavirus</i> genus	Myovirus	NC_041870	66.2	SL	University of Minho	Hospital waste water, Portugal, 2010	573	1
	Phage C	<i>Caudoviricetes, Pbunavirus</i>	Myovirus	OQ925957	65.6	SL	QAMH	Hospital waste water, Belgium, 2020	573	1
<i>Achromobacter xylosoxidans</i>	JWAlpha	<i>Schitoviridae, Jwalphavirus</i>	Podovirus	NC_023556	72.3	SL	DSMZ	Treatment plant waste water, Germany, 2012	1215103	0*
	JWDelta	<i>Schitoviridae, Jwalphavirus</i>	Podovirus	KF787094	73.7	SL	DSMZ	Treatment plant waste water, Germany, 2012	1215103	1
	JWT	<i>Caudoviricetes, Steinhovirus</i>	Siphovirus	OQ938574	50.0	SL	DSMZ	Treatment plant waste water, Germany, 2012	1215103	0*
	2-1	<i>Caudoviricetes</i>	Siphovirus	OQ974181	82.7	SL	DSMZ	Treatment plant waste water, Germany, 2012	1215103	0*
	JWX	<i>Caudoviricetes, Steinhovirus</i>	Siphovirus	NC_028768	49.7	SL	DSMZ	Treatment plant waste water, Germany 2012	ATCC27061	1
<i>Acinetobacter baumannii</i>	Acibel004	<i>Caudoviricetes Saclayvirus</i>	Myovirus	NC_025462	99.7	SL	QAMH	Hospital waste water, Ghent, 2009	070517/0072	0*
	Acibel007	<i>Autographiviridae, Daemvirus</i>	Podovirus	NC_025457	42.7	SL	QAMH	Hospital waste water, Ghent, 2009	070517/0072	0*
<i>Enterococcus</i> spp.	EFGrKN	<i>Herelleviridae, Schiekvirus</i>	Myovirus	MW004544	147.5	SL	Hebrew University, Jerusalem	Sewage water, Jerusalem, 2019	GE1555-19	3
	EFGrNG	<i>Herelleviridae, Schiekvirus</i>	Myovirus	MW004545	145.2	SL	Hebrew University, Jerusalem	Sewage water, Jerusalem, 2019	GE1555-19	2
	Efs7	<i>Caudoviricetes, Saphexavirus</i>	Siphovirus	OL870612	56.1	SL	ETH Zürich	Waste water, Switzerland, 2020	EF57	1
<i>Bacteroides fragilis</i>	UZM3	<i>Caudoviricetes</i>	Siphovirus	OQ116603	46.0	SL	QAMH	Hospital waste water, Ghent, 2010	V-191118-109	1
<i>Escherichia coli</i>	E4	<i>Straboviridae, Tequatrovirus</i>	Myovirus	OL870317	169.2	SL	ETH Zurich	Waste water, Switzerland, 2020	BL-21	1
<i>Klebsiella pneumoniae</i>	M1	<i>Straboviridae, Slopekvirus</i>	Myovirus	MW448170	176.3	SL	EIBMV	Sewage water, Tbilisi, 2012	Kp040762	4

<i>Mycobacterium abscessus</i>	8UZL	<i>Caudoviricetes, Mapvirus</i>	Siphovirus	OQ988004	47.8	SL	QAMH	Hospital waste water, Leuven, 2016	25300801D	3
<i>Stenotrophomonas maltophilia</i>	BUCT700	<i>Autographiviridae, Phikmvirus</i>	Podovirus	OM735686	43.2	SL	BUCT	Hospital waste water, Beijing, 2012	19008140792	2
<i>Staphylococcus aureus</i>	ISP	<i>Herelleviridae, Kayvirus</i>	Myovirus	NC_047720	138.3	SL	EIBMV	Unknown, Tbilisi, 1920-1930	13S44S	33
<i>Staphylococcus epidermidis</i>	BE06	<i>Herelleviridae, Sepunavirus</i>	Myovirus	MT596503	140.7	SL	University of Bern	Human skin, Bern, 2019	SKNA49	1

BUCT, Beijing University of Chemical Technology; DSMZ, “Deutsche Sammlung von Mikroorganismen und Zellkulturen” (German Collection of Microorganisms and Cell Cultures); EIBMV, Eliava Institute of Bacteriophages (Tbilisi), Microbiology and Virology; ETH Zürich, Eidgenössische Technische Hochschule Zürich; KU Leuven, Katholieke Universiteit Leuven; QAMH, Queen Astrid military hospital (Brussels); SIGSIM, State Institute for Genetics and Selection of Industrial Microorganisms (Moscow); SL, strictly lytic. *Always applied as part of a bacteriophage cocktail (see Extended Data Table 2).

Supplementary Table 4 | Characteristics of the six defined bacteriophage cocktails used in the present 100 consecutive bacteriophage therapy cases

Name	Bacterial host species	# bacteriophages	Bacteriophage names	Origin	# patients treated
BFC 1	<i>Pseudomonas aeruginosa</i> and <i>Staphylococcus aureus</i>	3	14-1, PNM, and ISP	QAMH	14
BFC 2	<i>Acinetobacter baumannii</i> , <i>P. aeruginosa</i> , and <i>S. aureus</i>	5	Acibel004, Acibel007, 14-1, PNM, and ISP	QAMH	8
PyoPhage	<i>Enterococcus (faecalis and faecium)</i> , <i>Escherichia coli</i> , <i>Proteus mirabilis</i> , <i>P. aeruginosa</i> , and <i>S. aureus</i>	18	Bacteriophages are not named	EIBMV	3
IntestiPhage	<i>Shigella (flexneri, sonnei, Newcastle)</i> , <i>Salmonella</i> (Paratyphi A, Paratyphi B, Typhumuriu, Enteritidis, Cholerasuis, Oranienburg), <i>E. coli</i> , <i>P. vulgaris</i> and <i>mirabilis</i> , <i>S. aureus</i> , <i>P. aeruginosa</i> and <i>Enterococcus</i> spp.	23 “bacteriophage clusters”	Bacteriophages are not named	EIBMV	1
APC 1.1	<i>Achromobacter xylosoxidans</i>	1	JWAlpha, JWDelta, and JWT	DSMZ	1
APC 2.1	<i>A. xylosoxidans</i>	3	JWAlpha, JWDelta, JWT, and 2-1	DSMZ	3

BUCT, Beijing University of Chemical Technology; DSMZ, “Deutsche Sammlung von Mikroorganismen und Zellkulturen” (German Collection of Microorganisms and Cell Cultures); EIBMV, Eliava Institute of Bacteriophages, Microbiology and Virology (Tbilisi); QAMH, Queen Astrid military hospital (Brussels).