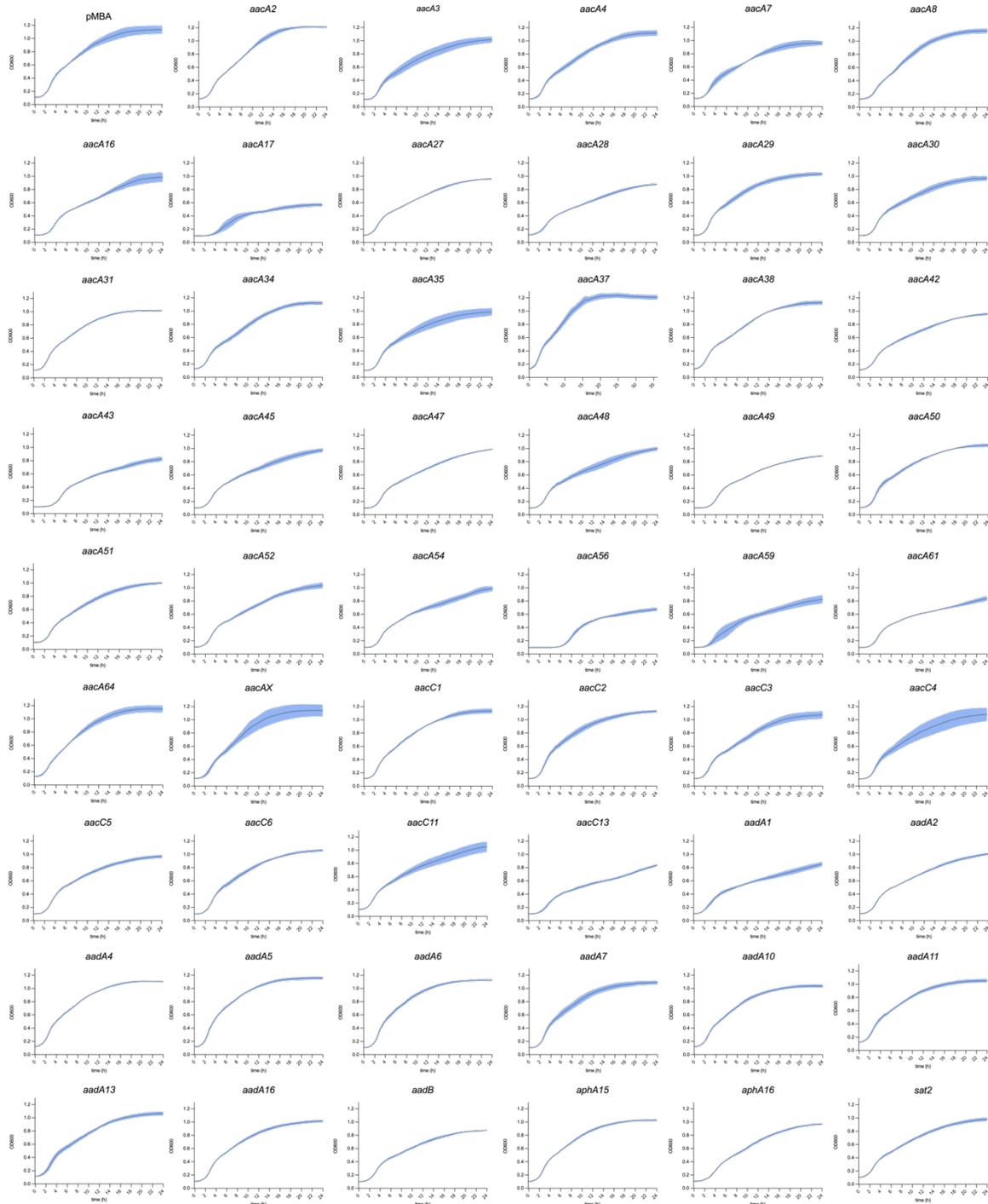
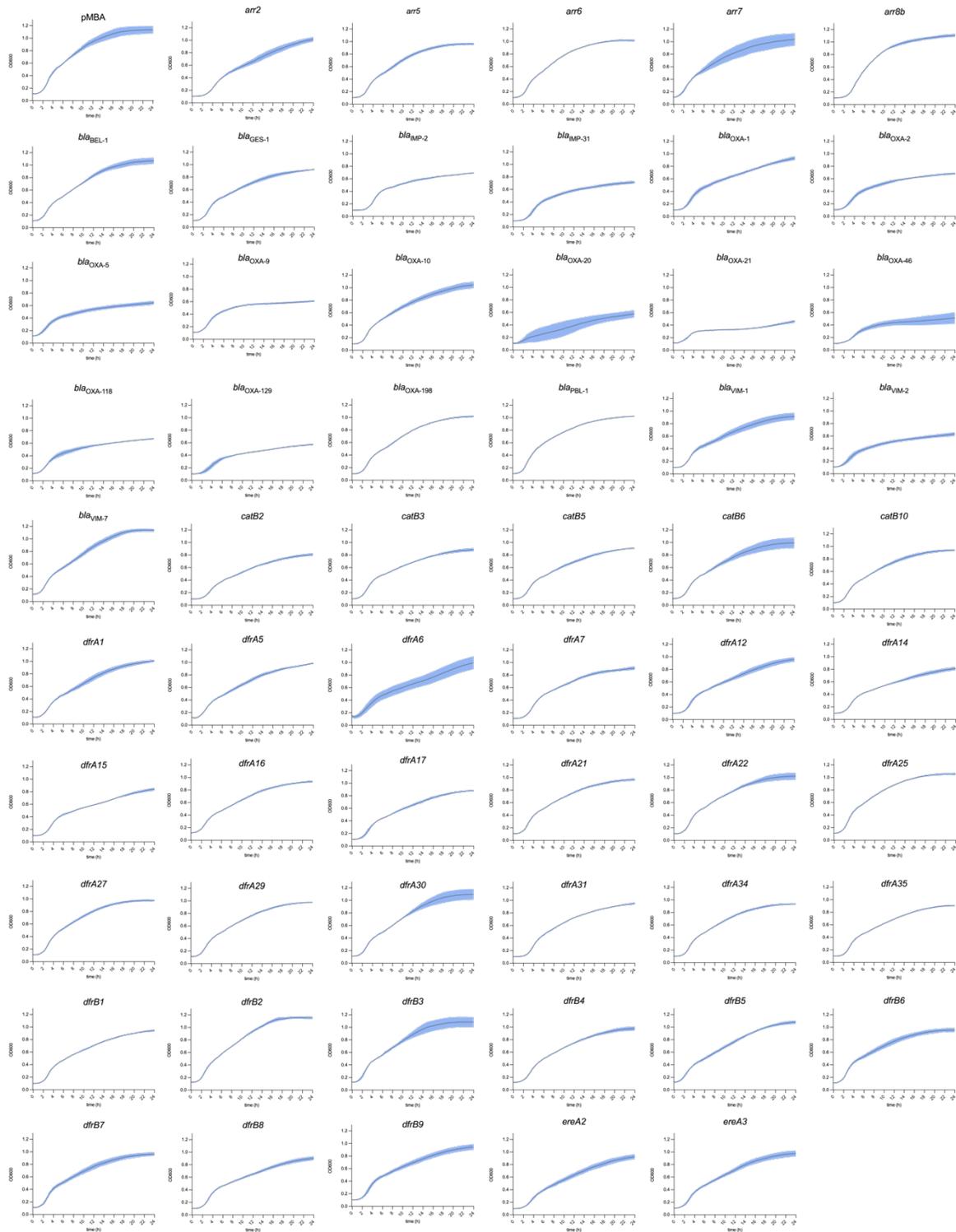


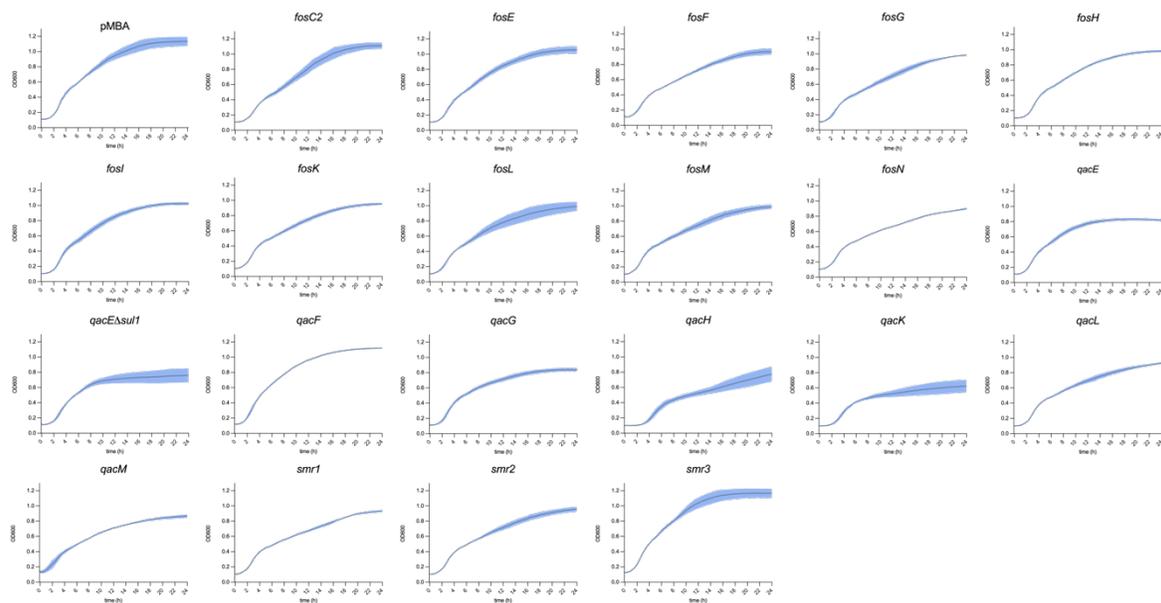
Fitness effects of antimicrobial resistance genes in changing environments.

Supplementary Material

pMBA_{ARC} GROWTH CURVES

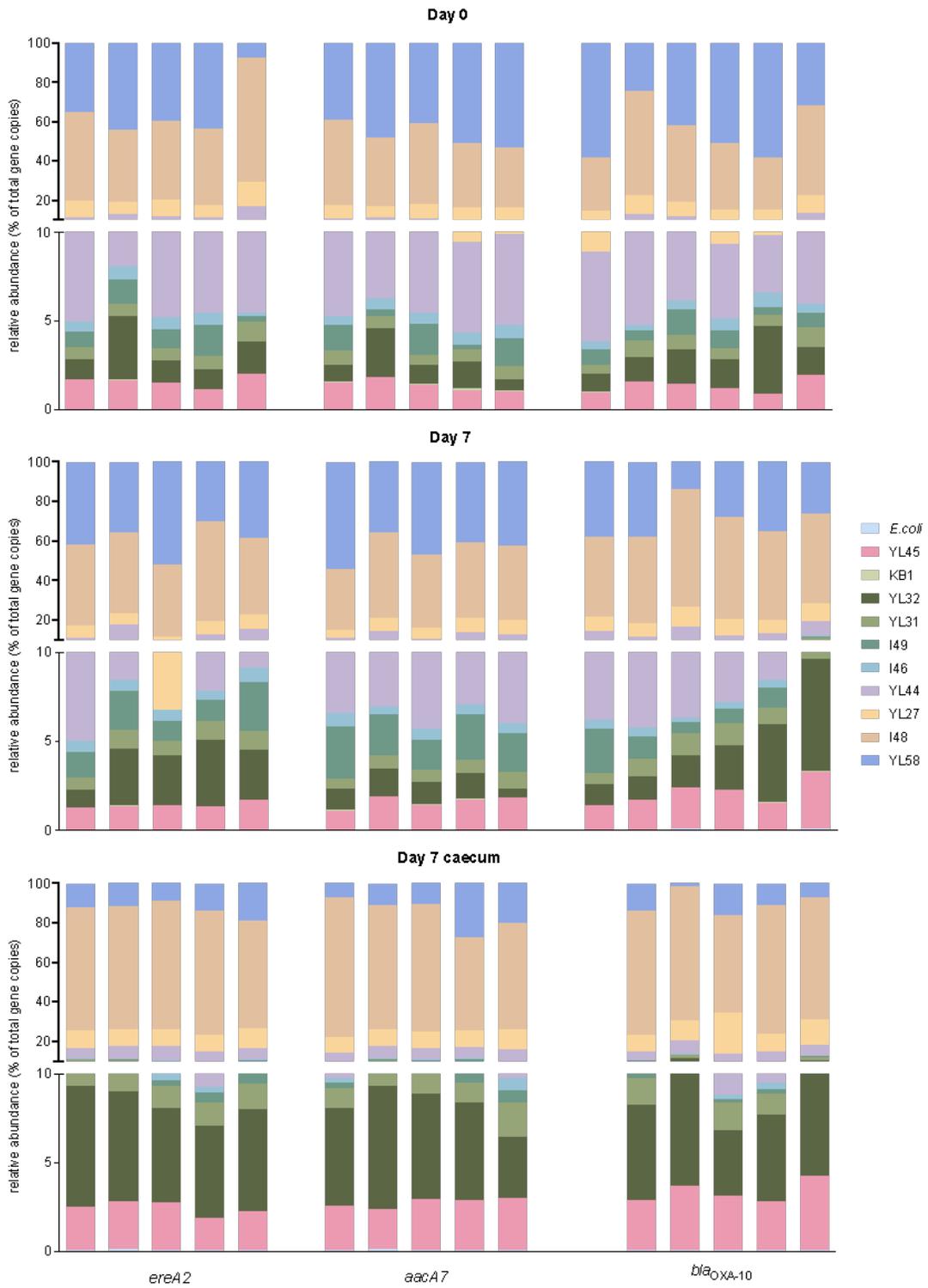




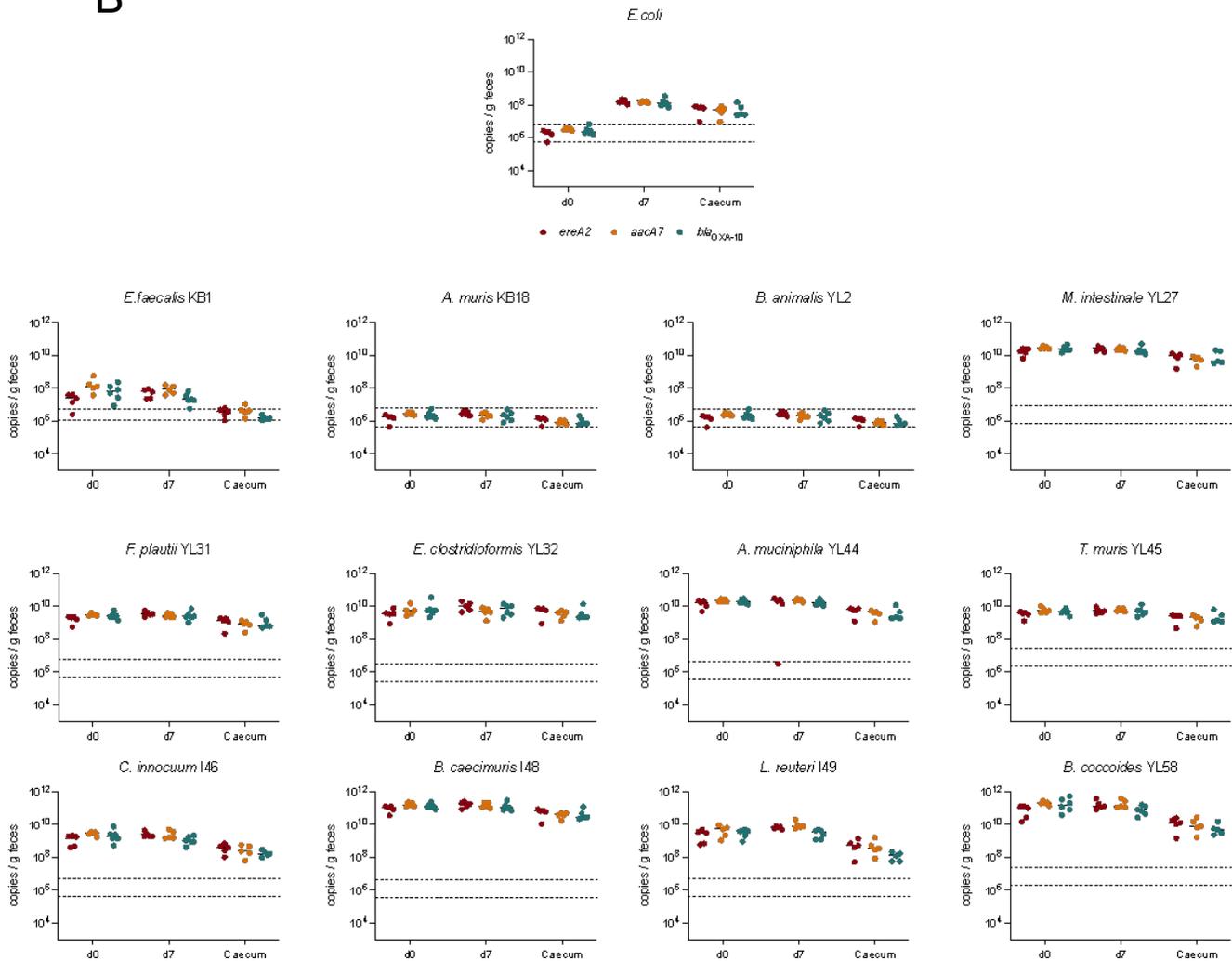


Supplementary Figure S1. Growth curves of all pMBA_{ARC}s. Growth of each pMBA derivate was assessed along 24h as described in materials and methods. Graphs represent the mean of three independent replicates being the standard error of the mean (SEM) represented as a shadow in lighter colour.

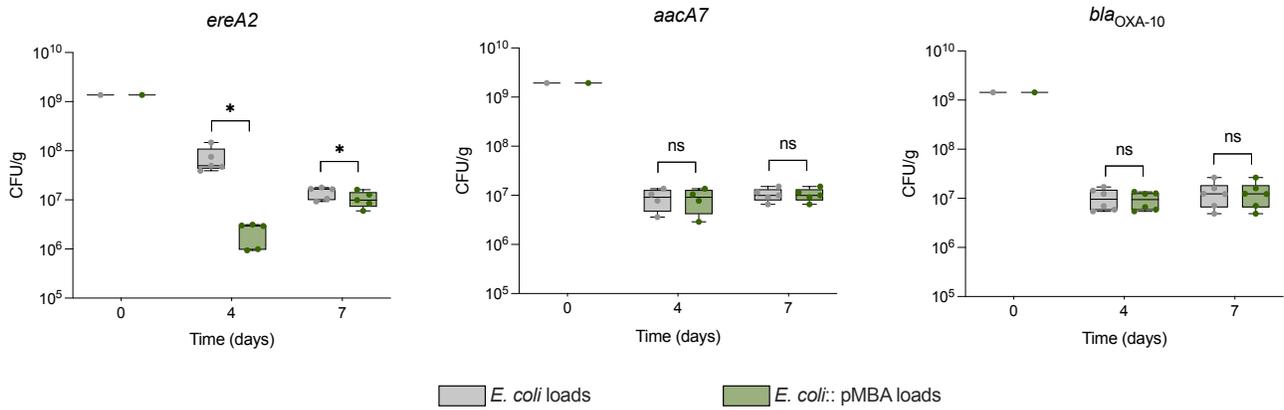
A



B

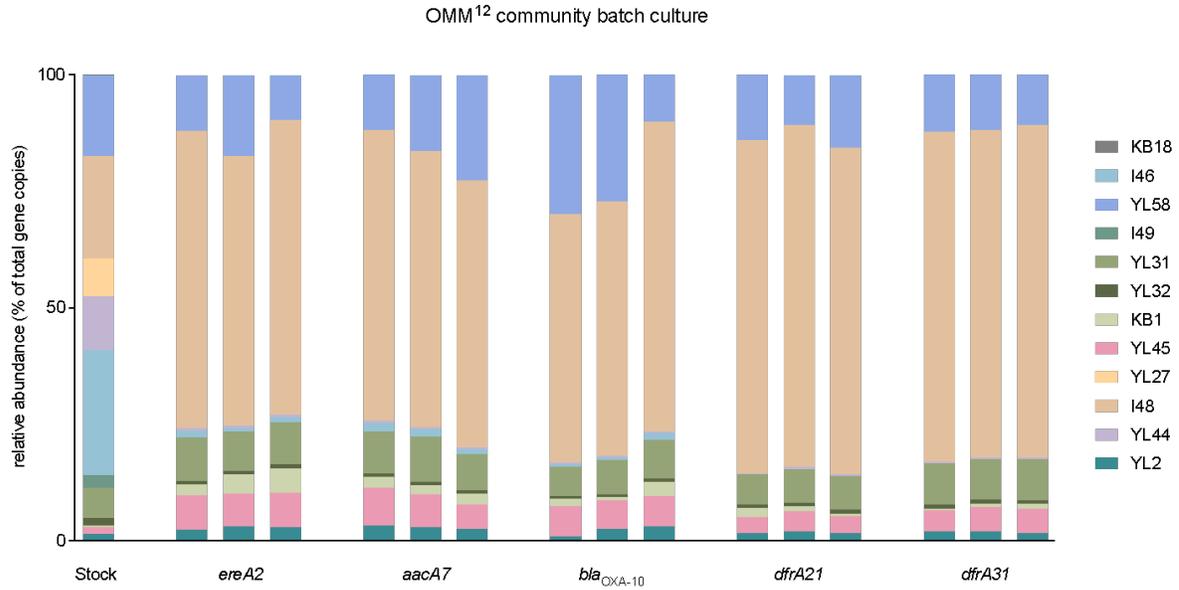


Supplementary Figure S2. Quantitation of OMM¹² members and *E. coli* abundance during *in vivo* competitions. A) Relative abundance in mice before (day 0) and after (day 7 and caecum) *in vivo* competitions. YL2 and KB18 are not present in the graph as their levels are under the limit of quantification. *E. coli* and OMM¹² members are represented in different colors following the figure legend pattern. B) Absolute quantification of bacterial species measured by qPCR (copies/ g feces). Dotted lines represent the limit of quantification and the limit of detection of the technique. Each competition is represented with a different color: red (*ereA2*), yellow (*aacA7*) and blue (*bla_{OXA-10}*). Data is represented as the median of at least 5 individuals.

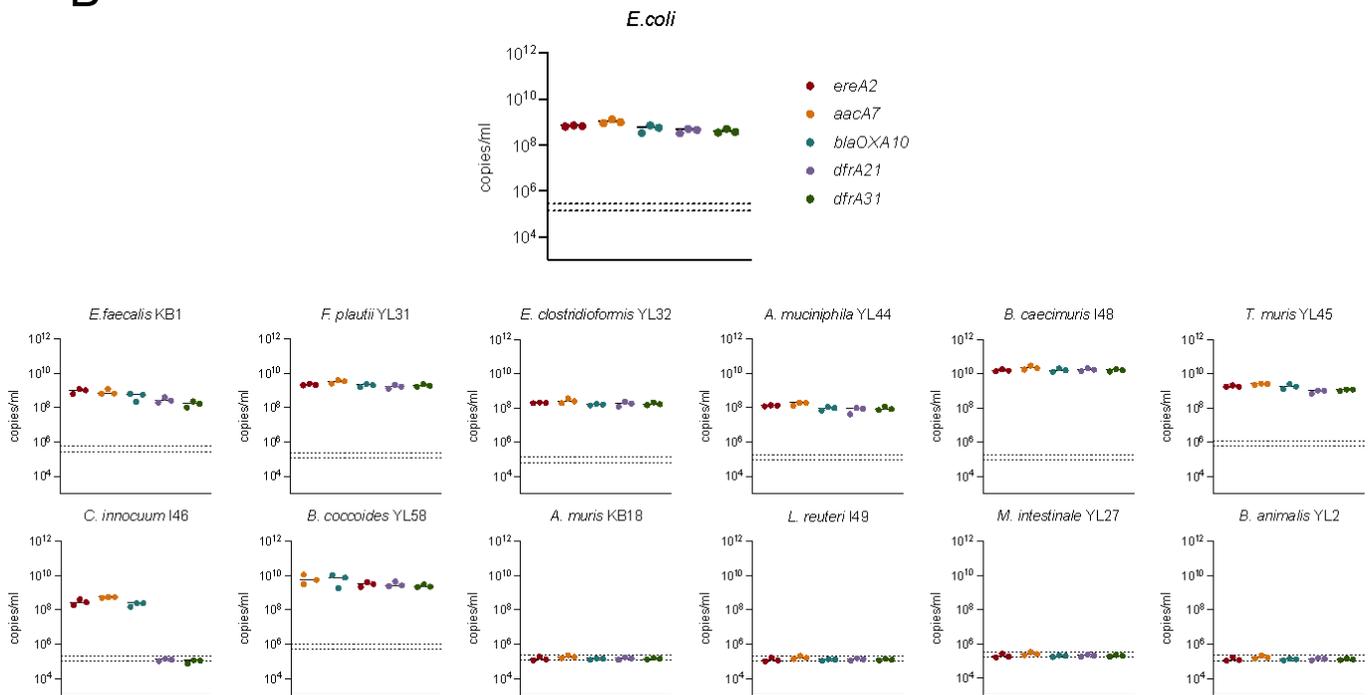


Supplementary Figure S3. Quantification of plasmid loss during *in vivo* experiments. Quantitation of total *E. coli* loads (grey boxes) and pMBA-containing *E. coli* (green boxes) at days 0, 4 and 7 of *in vivo* competitions pMBA \emptyset vs pMBA_{*ereA2*}, pMBA_{*aacA7*} or pMBA_{*bla*_{OXA-10}} (from left to right). Data is represented using a box-and-whisker plot, where each experimental group consists of at least five individuals. Statistical differences were assessed using a two-sided pair t-test. * $P < 0.05$. ns = non significant.

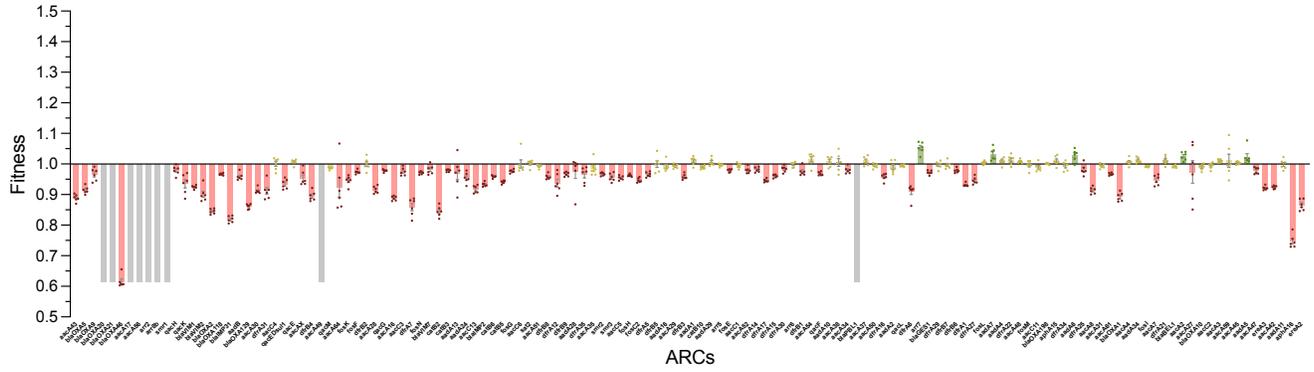
A



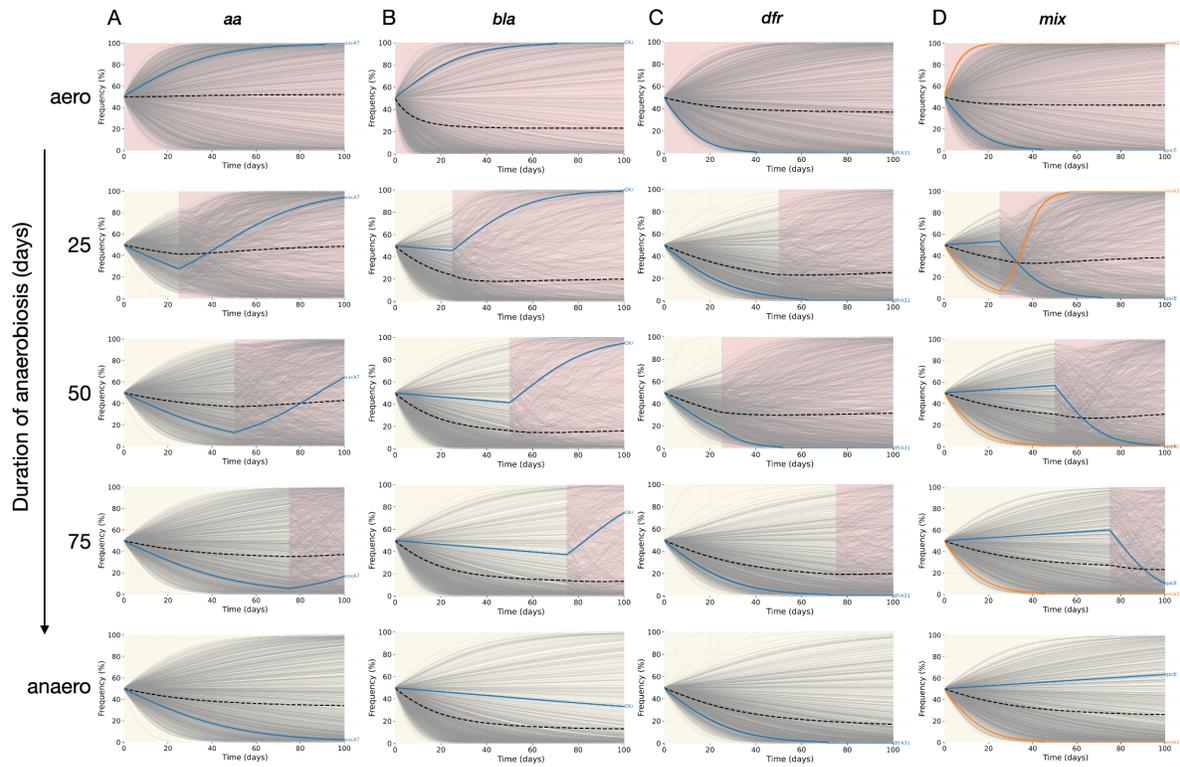
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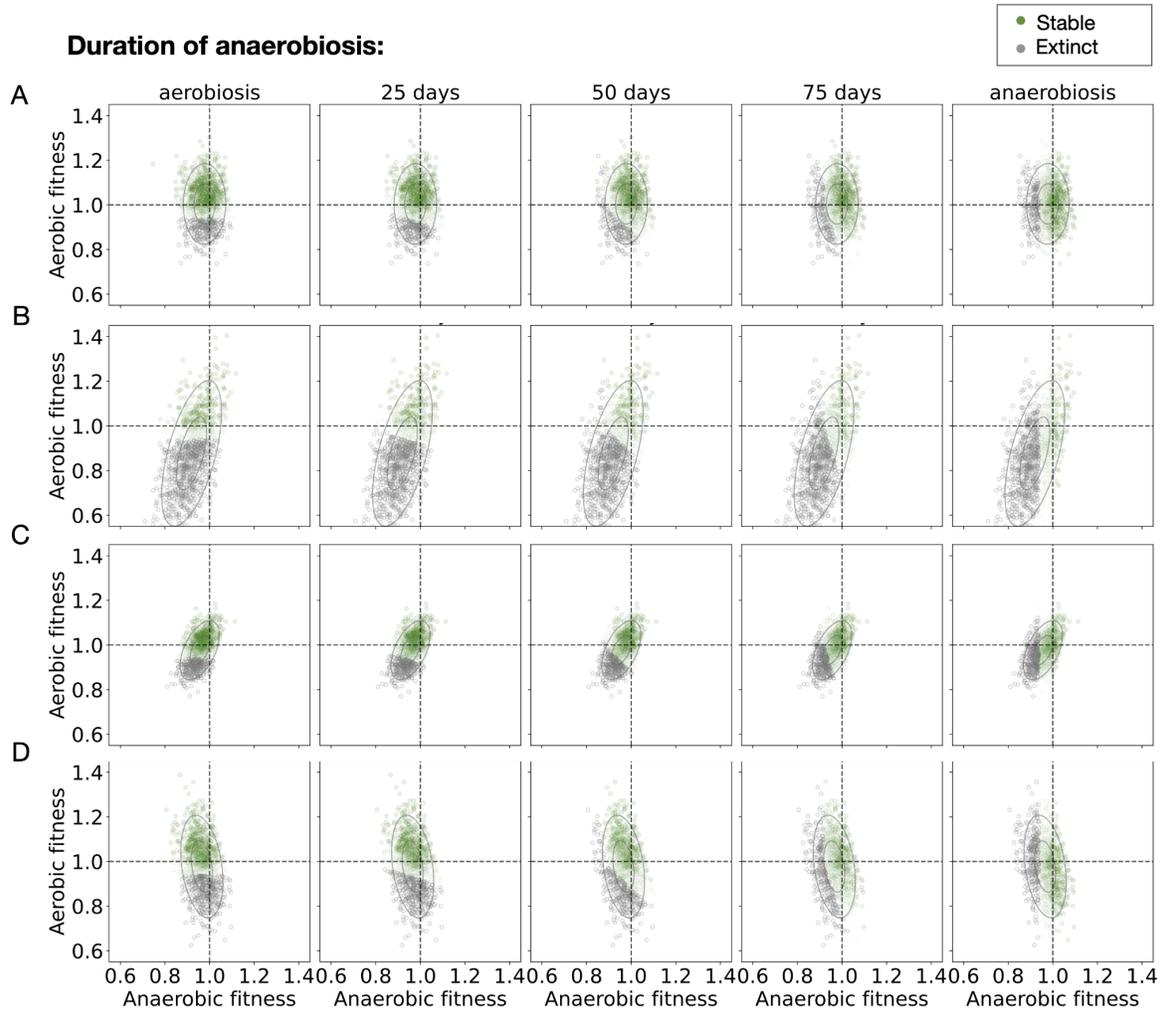
Supplementary Figure S4. Quantitation of OMM¹² members and *E. coli* abundance during *in vitro* anaerobic long-term competitions. **A) Relative abundance of OMM¹² community stock (day 0) and after *in vitro* competitions (day 4). OMM¹² members are represented in different colors following the figure legend pattern. **B**) Absolute quantification of bacterial species measured by qPCR (copies/ mL). Dotted lines represent de limit of quantification and the limit of detection of the technique. Each competition is represented with a different color: red (*ereA2*), yellow (*aacA7*) and blue (*bla_{OXA-10}*), purple (*dfrA21*) and green (*drfA31*). Data is represented as the median of 3 biological replicates.**



Supplementary Figure S5. ARC fitness effect characterization in the absence of oxygen. Graph showing the fitness effect of each ARC on bacterial growth in anaerobic conditions. ARCs are ordered by their fitness effect in aerobic conditions. Bars represent the mean of 6 independent replicates, error bars represent the standard error of the mean (SEM). Grey bars represent ARCs unable to be measured, red bars costly ARCs, yellow bars represent ARCs with no significant cost (according to a linear regression model), and green bars state for beneficial ARCs under no selective pressure.



Supplementary Figure S6. Long-term competition dynamics across families under increasing durations of anaerobic exposure. Each column corresponds to an ARC family (*aa*, *bla*, *dfr*, and *mix*), and each row shows simulations under a different duration of anaerobiosis (0, 25, 50, 75, and 100 days). Panels display the time-resolved frequency of the ARC-bearing strain during daily transfers. Light grey lines show trajectories from the synthetic fitness library, the dotted black line marks the family-level mean trajectory, and colored lines highlight experimentally measured ARCs included in the simulations. Background shading indicates the environmental state: yellow for anaerobic conditions and red for aerobic conditions.



Supplementary Figure S7. Joint fitness landscapes under increasing durations of anaerobiosis. Matrix of joint fitness landscapes showing aerobic and anaerobic fitness for all simulated ARC-bearing strains. Rows correspond to ARC families (top to bottom: *dfr*, *bla*, *aa*, *mix*), and columns reflect increasing durations of the initial anaerobic phase before switching to aerobiosis. Each point represents an individual ARC, with green indicating strains that persisted after 100 simulated transfers and gray those that went extinct. Under constant aerobiosis (leftmost column), survival is primarily linked to high aerobic fitness. Under constant anaerobiosis (rightmost column), survival depends on anaerobic fitness. In intermediate conditions, the survival boundary gradually rotates from vertical to horizontal, forming a rescue zone in the upper-right quadrant of the landscape. This pattern shows that the anaerobic-to-aerobic transition selects for asymmetric fitness profiles across environments. Strains with high fitness in one condition and lower fitness in the other fall within the rotated survival region and can be rescued by the switch, whereas those with low fitness in both environments remain outside this region and go extinct.

Supplementary Table 1. Fitness of ARCs. Using a linear regression model we estimate the coefficient of variation in the fitness of the host due to presence of the ARC and its significance (p-value). *qacEDsull* was excluded of the analysis.

ARC	Mean Fitness	Estimate Coefficient	p.value	Signif.
<i>aacA16</i>	0,89103033	-0.108969665915153	2.54383450158282e-09	Yes
<i>aacA2</i>	1,09047811	0.0904781099114083	6.70805464470306e-07	Yes
<i>aacA27</i>	1,0940067	0.0940066961825542	2.4781288515582e-07	Yes
<i>aacA28</i>	0,88969898	-0.110301020494876	1.64671472892138e-09	Yes
<i>aacA29</i>	0,97797824	-0.0220217583877921	0.222016882548585	No
<i>aacA3</i>	1,09970605	0.0997060486094533	4.63406467646282e-08	Yes
<i>aacA30</i>	0,84224679	-0.157753208072881	1.97023449562901e-17	Yes
<i>aacA31</i>	1,06641694	0.0664169410715887	0.000247319531029451	Yes
<i>aacA34</i>	1,07292802	0.0729280246942136	5.82478373829894e-05	Yes
<i>aacA35</i>	0,86266816	-0.127330439681827	0.061621311235983	No
<i>aacA37</i>	1,01302322	0.013023224071586	0.470005551463561	No
<i>aacA38</i>	1,00381505	0.00381504506736715	0.832354351366391	No
<i>aacA4</i>	1,07173937	0.0717393734847932	7.64960652396299e-05	Yes
<i>aacA42</i>	1,0597275	0.05972748262241	4.31102114466878e-16	Yes
<i>aacA45</i>	1,10215454	0.102154536493298	2.19786256289945e-08	Yes
<i>aacA47</i>	1,1141063	0.114106296802207	4.63704085310669e-10	Yes
<i>aacA48</i>	1,03298359	0.0329835862156377	0.0675996281489038	No
<i>aacA49</i>	0,8726956	-0.127330439681827	4.47057965122615e-12	Yes
<i>aacA50</i>	1,01374367	0.0137436718201931	0.445810163303787	No
<i>aacA51</i>	0,94818472	-0.051815284284993	0.00416457840393647	Yes
<i>aacA52</i>	0,99213752	-0.00786248392237139	0.662666485138717	No
<i>aacA54</i>	0,99780438	-0.00219562193379001	0.903034773263333	No
<i>aacA59</i>	1,1017635	0.101763503453451	2.47847590695871e-08	Yes
<i>aacA61</i>	1,06718645	0.0671864498943634	0.000209720371773661	Yes
<i>aacA64</i>	0,88137021	-0.118629790735572	9.81408382895727e-11	Yes
<i>aacA7</i>	1,07385231	0.0738523114783488	4.7000259252299e-05	Yes
<i>aacA8</i>	1,06611206	0.0661120565962777	0.00026390081683487	Yes
<i>aacAX</i>	0,86763853	-0.13236147387599	6.51363448178165e-13	Yes
<i>aacC1</i>	0,98673099	-0.0132690053788976	0.46167053579449	No
<i>aacC11</i>	1,03721139	0.0372113875572908	0.0392871798852348	Yes
<i>aacC13</i>	0,9224326	-0.0775673976664901	1.9386540938325e-05	Yes
<i>aacC2</i>	1,09839842	0.0983984184578898	6.85872941971349e-08	Yes
<i>aacC3</i>	0,8974388	-0.102561199696073	1.93888028898786e-08	Yes
<i>aacC4</i>	0,85980647	-0.140193526871609	3.06236013986103e-14	Yes
<i>aacC5</i>	0,9668523	-0.0331476979978856	0.0662490191092551	No
<i>aacC6</i>	0,94539829	-0.0546017141133318	0.0025411885297353	Yes
<i>aadA1</i>	0,97981395	-0.020186052506634	0.26292872403659	No
<i>aadA10</i>	1,00590273	0.00590273269723183	0.889084167908812	No
<i>aadA11</i>	1,15357713	0.153577128769275	1.20132745249857e-16	Yes
<i>aadA13</i>	0,91682104	-0.0831789649444479	4.74384379238295e-06	Yes
<i>aadA16</i>	0,97381803	-0.0261819690827634	0.146636788185361	No
<i>aadA2</i>	1,01942629	0.0194262856024843	0.281301264950391	No
<i>aadA24</i>	0,92078123	-0.0792187679628855	1.29234879739739e-05	Yes
<i>aadA28</i>	0,96074365	-0.0392563455538057	0.0297042840177138	Yes
<i>aadA29</i>	0,98291783	-0.0170821660885645	0.343386174432968	No
<i>aadA34</i>	1,00590273	0.00590273269723183	0.743280049408797	No
<i>aadA4</i>	1,03122263	0.0312226319287902	0.0835703586054944	No
<i>aadA5</i>	1,10684998	0.106849982721838	5.03754361958561e-09	Yes
<i>aadA6</i>	1,05102907	0.0510290659660828	0.00476916233393706	Yes
<i>aadA7</i>	1,03019667	0.0301966749927436	0.0942072126083767	No
<i>aadB</i>	0,78456162	-0.215438384319576	9.26387344934761e-30	Yes
<i>aphA15</i>	1,04319276	0.043192760093347	0.0168008866711324	Yes
<i>aphA16</i>	1,18290779	0.18290778919624	1.74529994296036e-22	Yes
<i>arr5</i>	0,98354495	-0.016450456700854	0.361381622324869	No
<i>arr6</i>	0,99709859	-0.00290141418452826	0.872101129570853	No
<i>arr7</i>	1,0216258	0.0216257979307883	0.230430220436606	No
<i>bla_{BEL-1}</i>	1,07946355	0.0794635459171045	1.21619761774725e-05	Yes
<i>bla_{GES-1}</i>	1,02206358	0.0220635792242336	0.221141323490614	No
<i>bla_{IMP-2}</i>	0,92804086	-0.0719591416900312	7.27579816907112e-05	Yes
<i>bla_{IMP-31}</i>	0,73311741	-0.266882586783711	1.22025404989602e-42	Yes
<i>bla_{OXA-1}</i>	1,06758593	0.067585931805878	0.000192391475894046	Yes

ARC	Mean Fitness	Estimate Coefficient	p.value	Signif.
<i>bla_{OXA-10}</i>	1,0972842	0.0972842045464649	9.54621415224918e-08	Yes
<i>bla_{OXA-118}</i>	0,73300187	-0.266998127680932	1.13753277229161e-42	Yes
<i>bla_{OXA-129}</i>	0,78992238	-0.210077623967472	1.65110220565007e-28	Yes
<i>bla_{OXA-198}</i>	1,03982063	0.0398206347073672	0.027444401263399	Yes
<i>bla_{OXA-2}</i>	0,73145378	-0.268546218524624	4.43509830701568e-43	Yes
<i>bla_{PBL-1}</i>	1,01032073	0.0103207302038903	0.56692004775218	No
<i>bla_{VIM-1}</i>	0,69170197	-0.308298028993115	6.4700031664572e-54	Yes
<i>bla_{VIM-2}</i>	0,71342666	-0.28657333780122	6.4205512614864e-48	Yes
<i>bla_{VIM-7}</i>	0,91032628	-0.0896737159302188	8.37927641485098e-07	Yes
<i>catB10</i>	0,98075113	-0.0192488732934684	0.285714280945808	No
<i>catB2</i>	0,91085542	-0.089144577286437	9.69070897663582e-07	Yes
<i>catB3</i>	0,91378134	-0.0862186561217764	2.1368229039416e-06	Yes
<i>catB5</i>	0,94040188	-0.0595981223793114	0.000993874323923482	Yes
<i>catB6</i>	0,94039647	-0.0596035282036071	0.00099280759119365	Yes
<i>dfrA1</i>	1,02593279	0.0259327926350017	0.15051258043648	No
<i>dfrA12</i>	0,95459133	-0.0454086737443989	0.0119680335475136	Yes
<i>dfrA14</i>	0,99228655	-0.00771345432055794	0.668674932847416	No
<i>dfrA15</i>	0,99533522	-0.00466477838243	0.79576120230066	No
<i>dfrA16</i>	1,01535494	0.0153549358213231	0.394351855702621	No
<i>dfrA17</i>	0,99246385	-0.00753614816675217	0.675851191837805	No
<i>dfrA21</i>	1,07490992	0.0749099184370004	3.66651887357442e-05	Yes
<i>dfrA22</i>	1,03212833	0.0321283284915967	0.0750105142463746	No
<i>dfrA25</i>	1,05814018	0.0581401758049288	0.00131629611988486	Yes
<i>dfrA27</i>	1,02656295	0.0265629546000959	0.140859365699586	No
<i>dfrA29</i>	1,02421651	0.0242165074038749	0.179363510517951	No
<i>dfrA30</i>	0,99651632	-0.00348367867611084	0.84672616252624	No
<i>dfrA31</i>	0,85184263	-0.148157369069202	1.18739642917594e-15	Yes
<i>dfrA34</i>	1,04931161	0.0493116066120347	0.00637531062544367	Yes
<i>dfrA35</i>	0,96199716	-0.0380028398372901	0.0353045310506094	Yes
<i>dfrA5</i>	0,96908404	-0.0309159596795574	0.0666424763668795	No
<i>dfrA6</i>	1,02108131	0.021081313133214	0.242366807452931	No
<i>dfrA7</i>	0,90058469	-0.099415313977862	5.05809320804145e-08	Yes
<i>dfrB1</i>	0,99730654	-0.00269346090930935	0.881197183751999	No
<i>dfrB2</i>	0,88879334	-0.1120665118373	1.2219278991245e-09	Yes
<i>dfrB3</i>	0,97810761	-0.0218923928970861	0.2247410229117	No
<i>dfrB4</i>	0,86800991	-0.131990086629749	7.50355891909296e-13	Yes
<i>dfrB5</i>	0,96913629	-0.0308637119721874	0.0871748748572427	No
<i>dfrB6</i>	1,02558654	0.0255865444758025	0.1560276153679975	No
<i>dfrB7</i>	1,02445992	0.0244599222975162	0.175037579653919	No
<i>dfrB8</i>	0,95412961	-0.0458703919764445	0.0111327288046359	Yes
<i>dfrB9</i>	0,95678711	-0.0432128897459212	0.0167502016601731	Yes
<i>ereA2</i>	1,38762587	0.38762587456872	7.67008572196664e-77	Yes
<i>ereA3</i>	1,11887879	0.118878785784974	8.99701798216223e-11	Yes
<i>fosC2</i>	0,96886364	-0.0311363613446677	0.0844255069637775	No
<i>fosE</i>	0,98465037	-0.015349630827938	0.394515142043139	No
<i>fosF</i>	0,88757918	-0.112420816510102	8.16474150365988e-10	Yes
<i>fosG</i>	0,94302882	-0.0569711796458333	0.00164200427103464	Yes
<i>fosH</i>	0,96801631	-0.0319836909442028	0.0763272561128757	No
<i>fosI</i>	1,07381139	0.0738113869547571	4.74511907089172e-05	Yes
<i>fosK</i>	0,88472193	-0.115278069497636	3.1162605511195e-10	Yes
<i>fosL</i>	1,02924211	0.0292421127113081	0.105056108554606	No
<i>fosM</i>	1,03615769	0.036157694727816	0.045177732486547	Yes
<i>fosN</i>	0,906155	-0.0938450031905921	2.59567026405454e-07	Yes
<i>qacE</i>	0,86503282	-0.134967176259973	2.39241089445013e-13	Yes
<i>qacF</i>	1,00211936	0.00211936138174216	0.906386853031281	No
<i>qacG</i>	0,89036283	-0.109637166146538	2.04661042067611e-09	Yes
<i>qacL</i>	1,02038906	0.0203890622720161	0.258163423701295	No
<i>qacM</i>	0,87888029	-0.12111970127228	4.0870501311157e-11	Yes
<i>sat2</i>	0,9463741	-0.0536259000759962	0.00302839738685803	Yes
<i>smr2</i>	0,96642316	-0.0335768426742675	0.0628222722142912	No
<i>smr3</i>	0,96663504	-0.0333649572469046	0.0644953733829977	No

Supplementary Table 2. Fitness effect of ARC families. Using a linear regression model we estimate the coefficient of variation in the fitness of the host due to presence of each family of ARCs and its significance ($\text{Pr}(>|t|)$ = p-value associated with the t-value). *qacEDsull* was excluded of the analysis.

Family	Estimate Coefficient	Std. Error	t value	Pr(> t)	Signif.
aminoglycoside	0.0031229	0.0053266	0.586	0.557873	ns
anti folates	-0.0146423	0.0075330	-1.944	0.052312	ns
beta lactam	-0.1037479	0.0104613	-9.917	< 2.00e-16	***
chloramphenicol	-0.0627628	0.0175051	-3.585	0.000359	***
fosfomycin	-0.0317774	0.0123780	-2.567	0.010451	*
macrolides	0.2532523	0.0276780	9.150	< 2.00e-16	***
QACs	-0.0585939	0.0147945	-3.961	8.22e-05	***
rifampicin	0.0007564	0.0225990	0.033	0.973307	ns

Supplementary Table 3. Fitness of ARCs in anaerobiosis. Using a linear regression model we estimate the coefficient of variation in the fitness of the host due to presence of the ARC and its significance (p-value). *qacEDsull* was excluded of the analysis.

ARC	Mean Fitness	Estimate Coefficient	p-value	Signif.
<i>aacA16</i>	0.88818546	-0.111814542368227	1.43020812086819e-39	Yes
<i>aacA2</i>	1.02540391	0.0254039137648204	0.00139501562406131	Yes
<i>aacA27</i>	0.97367978	-0.0263202183702418	0.000933071004145589	Yes
<i>aacA28</i>	0.91546436	-0.0845356444439471	1.36268006952517e-24	Yes
<i>aacA29</i>	0.99264448	-0.0073555226896281	0.353027324617999	No
<i>aacA3</i>	1.0102755	0.0102755008510779	0.194632115328611	No
<i>aacA30</i>	0.91206294	-0.0879370633637789	2.56428018813697e-26	Yes
<i>aacA31</i>	0.99350312	-0.00649687716293009	0.41199977427032	No
<i>aacA34</i>	0.97942948	-0.0205705174493173	0.00956227794842338	Yes
<i>aacA35</i>	0.98541257	-0.01459298813532968	0.0657663808371128	No
<i>aacA37</i>	1.00988888	0.00988887855814143	0.21193642058439	No
<i>aacA38</i>	1.00499908	0.00499907700410183	0.527833421697994	No
<i>aacA4</i>	1.00579365	0.0057936517221418	0.464399666266899	No
<i>aacA42</i>	0.92407012	-0.00851724719259447	0.282244409204175	No
<i>aacA43</i>	0.88881306	-0.111186936391225	3.35898473895961e-39	Yes
<i>aacA45</i>	1.00367062	0.00367062336197947	0.642945390494406	No
<i>aacA47</i>	0.97789862	-0.0221013781619788	0.00538637176210709	Yes
<i>aacA48</i>	1.00851725	0.00851724719259447	0.282244409204175	No
<i>aacA50</i>	0.99377617	-0.00622383353973016	0.431915057815362	No
<i>aacA51</i>	0.99283878	-0.0071612164403353	0.365881057277054	No
<i>aacA52</i>	0.97958646	-0.0204135449719018	0.0101230121031668	Yes
<i>aacA54</i>	1.01539589	0.0153958927977411	0.0521742497138952	No
<i>aacA59</i>	1.01042849	0.0104284870748967	0.188079671262742	No
<i>aacA61</i>	0.9669787	-0.0330212952109053	3.43656575362306e-05	Yes
<i>aacA64</i>	0.92363725	-0.0763627489462424	1.22192685242272e-20	Yes
<i>aacA7</i>	0.94691367	-0.0503843346220288	4.40919580586168e-11	Yes
<i>aacA8</i>	0.91358511	-0.0864148890311938	1.53716301695987e-25	Yes
<i>aacAX</i>	0.95383848	-0.0461615247038747	8.71438220872600e-09	Yes
<i>aacC1</i>	0.99433843	-0.00566156918703544	0.47464072166871	No
<i>aacC11</i>	0.98852831	-0.0114716908604802	0.147688338915958	No
<i>aacC13</i>	0.91705522	-0.0829447827999136	8.42551159179977e-24	Yes
<i>aacC2</i>	0.99418269	-0.00581731324317112	0.46257830171021	No
<i>aacC3</i>	0.97508096	-0.0249190435115458	0.00171757834495151	Yes
<i>aacC4</i>	1.00013612	0.000136119451329872	0.986282813495671	No
<i>aacC5</i>	0.95455059	-0.0454494064384719	1.44894990239103e-08	Yes
<i>aacC6</i>	0.9992852	-7.14817372971172e-05	0.992796302216256	No
<i>aadA1</i>	1.01025506	0.0102550571451573	0.195520287992696	No
<i>aadA10</i>	1.0126278	0.0126278024319471	0.316988018507628	No
<i>aadA11</i>	0.99858087	-0.00141912568094984	0.857747110984892	No
<i>aadA13</i>	0.96988904	-0.0301109576768169	0.000155799958532185	Yes
<i>aadA16</i>	0.99207137	-0.00792862602511145	0.316807575560758	No
<i>aadA2</i>	0.98929202	-0.0107079761651898	0.176532819633306	No
<i>aadA24</i>	0.95462003	-0.0453799697677697	1.5220499983604e-08	Yes
<i>aadA28</i>	0.97472002	-0.025279979216736	0.00147165874371937	Yes
<i>aadA29</i>	1.00612306	0.00612305531144821	0.439404585931945	No
<i>aadA34</i>	1.0126278	0.0126278024319479	0.111077699958758	No
<i>aadA4</i>	1.00889795	0.00889794736160617	0.261307170799104	No
<i>aadA5</i>	1.0226573	0.0226573022571856	0.00433731925123746	Yes
<i>aadA6</i>	1.0288305	0.0288304989841986	0.00029174098002905	Yes
<i>aadA7</i>	1.0324082	0.0324082041596407	4.77198843051302e-05	Yes
<i>aadB</i>	0.958875	-0.0411250016847504	2.74789605321441e-07	Yes
<i>aphA15</i>	1.00987136	0.00987136029531336	0.212746081789463	No
<i>aphA16</i>	0.74709522	-0.252904775593508	6.18462127744657e-134	Yes
<i>arr5</i>	0.99600853	-0.00399147217908638	0.614192018994877	No
<i>arr6</i>	0.99834312	-0.00165687837984243	0.834236588669039	No
<i>arr7</i>	1.05302307	0.0530230676470966	4.6328169904731e-11	Yes
<i>bla_{BEL-1}</i>	0.99043569	-0.00956431194628001	0.227302350855701	No
<i>bla_{GES-1}</i>	0.97212597	-0.0278740273625403	0.000459136743014409	Yes
<i>bla_{MIP-2}</i>	0.93288277	-0.0671122990902588	1.60046109984009e-16	Yes
<i>bla_{MIP-31}</i>	0.81904227	-0.18095727111518	1.02444432157664e-84	Yes
<i>bla_{OXA-1}</i>	0.89257766	-0.107422337804334	5.34004917572467e-37	Yes
<i>bla_{OXA-10}</i>	0.98954282	-0.010451789226861	0.1868689175345832	No
<i>bla_{OXA-118}</i>	0.96666774	-0.0333322550856628	2.90360973513416e-05	Yes
<i>bla_{OXA-129}</i>	0.86140355	-0.138596447890502	3.03763093485754e-56	Yes
<i>bla_{OXA-198}</i>	1.00065872	0.000658717271177778	0.933692395623497	No
<i>bla_{OXA-2}</i>	0.84485085	-0.155149151366856	3.61838218923809e-67	Yes
<i>bla_{OXA-46}</i>	0.61562764	-0.384372355315825	3.64345003177508e-215	Yes
<i>bla_{OXA-5}</i>	0.91446074	-0.0855392591612392	4.26604962038884e-25	Yes
<i>bla_{OXA-9}</i>	0.96595684	-0.0340431649841392	1.96525403165753e-05	Yes
<i>bla_{VM-1}</i>	0.92445646	-0.0755435373957293	2.93390400800848e-20	Yes
<i>bla_{VM-2}</i>	0.90121478	-0.0987852223377399	4.15777061650199e-32	Yes
<i>bla_{VM-7}</i>	0.98132152	-0.0186784792847363	0.0185712690512566	Yes
<i>catB10</i>	0.95875539	-0.0112446114330192	0.15886006470431	No
<i>catB2</i>	0.84484836	-0.155151636979202	3.60453547867108e-67	Yes
<i>catB3</i>	0.97862596	-0.0213740369481794	0.00710422764616624	Yes
<i>catB5</i>	0.94079008	-0.0592099165777994	2.47861706524161e-13	Yes
<i>catB6</i>	0.95846483	-0.04153517649841392	2.1012050731657678e-07	Yes
<i>dfrA1</i>	0.9314048	-0.0685951986049421	3.72562104453289e-17	Yes
<i>dfrA12</i>	0.93761314	-0.0623868600863455	1.41133638449275e-14	Yes
<i>dfrA14</i>	0.98123325	-0.0187667486703357	0.0180250965326888	Yes
<i>dfrA15</i>	0.96043011	-0.0395698857658761	7.4441402029789e-07	Yes
<i>dfrA16</i>	0.95745544	-0.0425445586600429	1.07521956640133e-07	Yes
<i>dfrA17</i>	0.94573028	-0.0542697159671747	1.67737990540927e-11	Yes
<i>dfrA21</i>	1.01100467	0.0110046690327404	0.164863654129723	No
<i>dfrA22</i>	1.01288435	0.0128843512323463	0.1040319490833296	No
<i>dfrA25</i>	0.98146442	-0.018535827627596	0.0194862437225526	Yes
<i>dfrA27</i>	0.94582126	-0.0541787353321734	1.80768088756234e-11	Yes
<i>dfrA29</i>	0.99677894	-0.00322106032641007	0.684144145522116	No
<i>dfrA30</i>	0.9835912	-0.01640879751232063	0.0385443691743575	Yes
<i>dfrA31</i>	0.91210711	-0.0878928862562116	2.70186653500056e-26	Yes
<i>dfrA34</i>	0.99342178	-0.0065782229842886	0.406173848704657	No
<i>dfrA35</i>	0.96494698	-0.030530240017476	1.11520947663671e-05	Yes
<i>dfrA5</i>	0.96560283	-0.0343971679164617	1.61385219490833296	No
<i>dfrA6</i>	0.91011675	-0.0898832519316878	2.5213410312369e-27	Yes
<i>dfrA7</i>	0.85895539	-0.141044614217571	7.76883546624718e-58	Yes
<i>dfrB1</i>	0.9753185	-0.0246814957444245	0.00189953527242418	Yes
<i>dfrB2</i>	0.99968939	-0.000310611594049585	0.06075019143575	No
<i>dfrB3</i>	0.95831425	-0.0416857459717304	1.90301488965945e-07	Yes
<i>dfrB4</i>	0.8953804	-0.104619601069559	2.18735877718062e-35	Yes
<i>dfrB5</i>	0.99950566	-0.000494338187256156	0.950213949249907	No
<i>dfrB6</i>	0.97820464	-0.021795368441115	0.00605719980767237	Yes
<i>dfrB7</i>	0.99670608	-0.00329391880620363	0.677398822889152	No
<i>dfrB8</i>	0.95822738	-0.0417726173918437	1.79704151672149e-07	Yes
<i>dfrB9</i>	0.9665808	-0.0334191985370282	2.76930377721066e-05	Yes
<i>ereA2</i>	0.86579955	-0.1342005279783	2.07627886402619e-53	Yes
<i>ereA3</i>	0.92107491	-0.0789250933588724	7.55519758133371e-22	Yes
<i>fosC2</i>	0.94668006	-0.0533199374306314	3.64371738998041e-11	Yes
<i>fosE</i>	0.97883912	-0.0211608842201547	0.00769368104971156	Yes
<i>fosF</i>	0.97377201	-0.0262279883694019	0.000972110265458111	Yes
<i>fosG</i>	0.97618689	-0.023813109051419	0.00272621418537525	Yes
<i>fosH</i>	0.96267303	-0.0373269744803273	2.95663833090814e-06	Yes
<i>fosI</i>	0.99130168	-0.00869831973967378	0.272147884466648	No
<i>fosK</i>	0.94557248	-0.0544275231752081	1.47291787769473e-11	Yes
<i>fosL</i>	1.00401108	0.00401107651541484	0.612453727869469	No
<i>fosM</i>	0.99647252	-0.0035247902760179	0.655951981131507	No
<i>fosN</i>	0.97101492	-0.0289850788667577	0.000270795770557815	Yes
<i>qacE</i>	1.0070819	0.00708190093170108	0.371211025323446	No
<i>qacF</i>	0.96823538	-0.0317646207384475	6.6973933835342e-05	Yes
<i>qacG</i>	0.97803899	-0.0219610072661738	0.00568526174679478	Yes
<i>qacH</i>	0.97951269	-0.0204873100288299	0.00985595402413285	Yes
<i>qacK</i>	0.93506895	-0.064931049094233	1.30612904285598e-15	Yes
<i>qacL</i>	0.99450888	-0.00549111581826872	0.486038452064334	No
<i>qacM</i>	0.98680104	-0.0131989592646219	0.095856719311087	No
<i>satI</i>	1.00151807	0.00151807116238617	0.847946111947095	No
<i>smr2</i>	0.96688736	-0.0331126423638163	3.27104301286226e-05	Yes
<i>smr3</i>	0.95595056	-0.0440494350231135	3.86063287712273e-08	Yes

Supplementary Table 4. Fitness effect of ARC families in anaerobiosis. Using a linear regression model we estimate the coefficient of variation in the fitness of the host due to presence of each family of ARCs and its significance ($\Pr(>|t|)$ = p-value associated with the t-value). *qacEDsull* was excluded of the analysis.

Family	Estimate Coefficient	Std. Error	t value	Pr(> t)	Signif.
aminoglycoside	-0.023208	0.002982	-7.782	2.38e-14	***
anti folates	-0.037834	0.004218	-8.970	< 2.00e-16	***
beta lactam	-0.089173	0.005479	-16.276	< 2.00e-16	***
chloramphenicol	-0.057703	0.009801	-5.888	5.92e-09	***
fosfomycin	-0.025348	0.006930	-3.658	0.000273	***
macrolides	-0.106563	0.015497	-6.877	1.30e-11	***
QACs	-0.025324	0.007305	-3.467	0.000557	***
rifampicin	0.015792	0.012653	1.248	0.212402	ns

Supplementary Table 5. Effect of oxygen in ARC families fitness effect. We estimate for each family of ARCs the variation of the fitness effect depending on oxygen availability. Using a linear regression model we determine the significance ($\Pr(>|t|) = p$ -value associated with the t-value). *qacEDsull* was excluded of the analysis together with ARCs that were not able to be measure in both conditions.

Family	Estimate Coefficient	Std. Error	t value	Pr(> t)	Signif.
ARCs	-0.018671	0.004475	-4.173	3.19e-05	***
aminoglycoside	-0.0263312	0.0060786	-4.332	1.58e-05	***
anti folates	-0.0231914	0.0085965	-2.698	0.00706	**
beta lactam	0.0145748	0.0115591	1.261	0.20755	ns
chloramphenicol	0.0050597	0.0199764	0.253	0.80009	ns
fosfomicin	0.0064297	0.0141255	0.455	0.64904	ns
macrolides	-0.3598151	0.0315855	-11.392	< 2.00e-16	***
QACs	0.0332701	0.0159176	2.090	0.03678	*
rifampicin	0.0150351	0.0257894	0.583	0.55999	ns

Supplementary Table 6. Effect of oxygen in ARCs fitness effect. We estimate for each family of ARCs the estimate coefficient of variation of the fitness effect depending on oxygen availability (Anaero – aero). Using a linear regression model we determined its significance (p-value). *qacEDsull* was excluded of the analysis together with ARCs that were not able to be measure in both conditions.

ARC	Estimate Coefficient	p.value	Signif.
<i>aacA16</i>	-0.00284487645307367	0.884436116333142	No
<i>aacA2</i>	-0.0650741961465879	0.000908746715387576	Yes
<i>aacA27</i>	-0.120326914552796	1.05034580157022e-09	Yes
<i>aacA28</i>	0.0257653760509293	0.188198033208357	No
<i>aacA29</i>	0.0146662356978293	0.453716677379749	No
<i>aacA3</i>	-0.089430547583754	5.36295680362473e-06	Yes
<i>aacA30</i>	0.0698161447091021	0.000373832327821233	Yes
<i>aacA31</i>	-0.0729138182345187	0.000203281790877981	Yes
<i>aacA34</i>	-0.093498542143531	1.98250069600657e-06	Yes
<i>aacA35</i>	0.0191444102295249	0.328111217162386	No
<i>aacA37</i>	-0.00313434551344451	0.872773026761822	No
<i>aacA38</i>	0.00118403193673469	0.951762382713243	No
<i>aacA4</i>	-0.065945720312579	0.00077497581027666	Yes
<i>aacA42</i>	-0.226502829615538	1.70783186747207e-29	Yes
<i>aacA45</i>	-0.0984839131313188	5.54961387398044e-07	Yes
<i>aacA47</i>	-0.136207674964186	5.48323832318276e-12	Yes
<i>aacA48</i>	-0.024466390230433	0.211436563267248	No
<i>aacA50</i>	-0.019967505359923	0.307750714933316	No
<i>aacA51</i>	0.0446540678446577	0.0226642233679374	Yes
<i>aacA52</i>	-0.0125510610495304	0.52139426029353	No
<i>aacA54</i>	0.0175915147315312	0.368850769248485	No
<i>aacA59</i>	-0.0913350163785547	3.38220237121227e-06	Yes
<i>aacA61</i>	-0.100207745105269	3.52458399585289e-07	Yes
<i>aacA64</i>	0.0422670417893293	0.0309703084305755	Yes
<i>aacA7</i>	-0.126936646100377	1.26482333732943e-10	Yes
<i>aacA8</i>	-0.152526945627471	1.36259491088327e-14	Yes
<i>aacAX</i>	0.0861999491721152	1.14930139271371e-05	Yes
<i>aacC1</i>	0.00760743619186206	0.697525855514186	No
<i>aacC11</i>	-0.048683078417771	0.012984654999401	Yes
<i>aacC13</i>	-0.00537738513342354	0.783520787469192	No
<i>aacC2</i>	-0.104215731701061	1.19374399763984e-07	Yes
<i>aacC3</i>	0.0776421561845268	7.67460935533939e-05	Yes
<i>aacC4</i>	0.140329646322939	1.2755935376123e-12	Yes
<i>aacC5</i>	-0.0123017084405863	0.529701977302284	No
<i>aacC6</i>	0.0545302323760349	0.00540787617850619	Yes
<i>aadA10</i>	0.0304411096658207	0.12006044805106	No
<i>aadA11</i>	0.00541206321788533	0.78215988592279	No
<i>aadA11</i>	-0.154996254450225	5.22098785325491e-15	Yes
<i>aadA13</i>	0.053068007267631	0.00678308851817419	Yes
<i>aadA16</i>	0.0182533430576519	0.351117085401569	No
<i>aadA2</i>	-0.0301342617676741	0.1238371792989	No
<i>aadA24</i>	0.0338387981951157	0.0840187864551999	No
<i>aadA28</i>	0.0139763663370698	0.475228279050906	No
<i>aadA29</i>	0.0232052214000127	0.23591839745248	No
<i>aadA34</i>	0.00672506973474582	0.731158546797249	No
<i>aadA4</i>	-0.022324684567184	0.254161539914554	No
<i>aadA5</i>	-0.0841926804646524	1.82250357638986e-05	Yes
<i>aadA6</i>	-0.0221985669818841	0.256852844426821	No
<i>aadA7</i>	0.0022115291668971	0.91003867862303	No
<i>aadB</i>	0.174313382634825	1.81574979818727e-18	Yes
<i>aphA15</i>	-0.0333213997980336	0.0888600304939032	No
<i>aphA16</i>	-0.435812564789748	1.06920747549162e-92	Yes
<i>arr5</i>	0.0124635729509989	0.52430145061447	No
<i>arr6</i>	0.00124453580468576	0.94300690504569	No
<i>arr7</i>	0.0313972697163082	0.108868918706286	No
<i>bla_{BEL-1}</i>	-0.0890278578633843	5.90549157119048e-06	Yes
<i>bla_{GES-1}</i>	-0.0499376065867739	0.0108329919153738	Yes
<i>bla_{IMP-2}</i>	0.00484684259977234	0.804421669253792	No
<i>bla_{IMP-31}</i>	0.0859248596721936	1.22496093336582e-05	Yes
<i>bla_{OXA-1}</i>	-0.175008269610212	1.34318676848518e-18	Yes

ARC	Estimate Coefficient	p.value	Signif.
<i>bla_{OXA-10}</i>	-0.107741383469151	4.46361370246674e-08	Yes
<i>bla_{OXA-118}</i>	0.233665872595269	3.45787981013065e-31	Yes
<i>bla_{OXA-129}</i>	0.0714811760769699	0.000270208834769765	Yes
<i>bla_{OXA-198}</i>	-0.0391619174361892	0.0455842115323843	Yes
<i>bla_{OXA-2}</i>	0.113397067157768	8.6664583846207e-09	Yes
<i>bla_{VM-1}</i>	0.232754491597386	5.70933110391544e-31	Yes
<i>bla_{VM-2}</i>	0.187788115463481	4.38140119350971e-21	Yes
<i>bla_{VM-7}</i>	0.0709952366454826	0.000297262878656778	Yes
<i>catB10</i>	0.00800426186044921	0.682587455173101	No
<i>catB2</i>	-0.0660070596927645	0.000766286774245292	Yes
<i>catB3</i>	0.0648446191735972	0.000947390239727463	Yes
<i>catB5</i>	0.000388205801512052	0.984175824776274	No
<i>catB6</i>	0.018068354807752	0.356018505161623	No
<i>dfrA1</i>	-0.0945279912399439	1.53155413610866e-06	Yes
<i>dfrA12</i>	-0.0169781863419467	0.385773753284501	No
<i>dfrA14</i>	-0.0110532943497777	0.572283561323265	No
<i>dfrA15</i>	-0.0349051079276331	0.074715425174276	No
<i>dfrA16</i>	-0.0578994944813658	0.0031473931320919	Yes
<i>dfrA17</i>	-0.0467335678004225	0.0170817548481403	Yes
<i>dfrA21</i>	-0.06390524940426	0.00112192779682438	Yes
<i>dfrA22</i>	-0.0192439772592483	0.325602779554605	No
<i>dfrA25</i>	-0.076675585676883	9.40599849605494e-05	Yes
<i>dfrA27</i>	-0.0807416899322692	3.9369408596941e-05	Yes
<i>dfrA29</i>	-0.027437567730285	0.161134037328204	No
<i>dfrA30</i>	-0.0129251188361955	0.50905827081645	No
<i>dfrA31</i>	0.0602644828129905	0.00211824760579432	Yes
<i>dfrA34</i>	-0.0558898289104636	0.00436082145501692	Yes
<i>dfrA35</i>	0.00294981583554247	0.880204935684559	No
<i>dfrA5</i>	-0.00348120823690439	0.858834066417399	No
<i>dfrA6</i>	-0.110964565064902	1.77010802435699e-08	Yes
<i>dfrA7</i>	-0.0416293002397085	0.0335898543373227	Yes
<i>dfrB1</i>	-0.0219880348351152	0.261389529624734	No
<i>dfrB2</i>	0.110896043524323	1.80571598083107e-08	Yes
<i>dfrB3</i>	-0.019793350746443	0.311987259210718	No
<i>dfrB4</i>	0.02737048556019	0.162159787233853	No
<i>dfrB5</i>	0.0303693737849312	0.120935194621041	No
<i>dfrB6</i>	-0.0473819083199133	0.0156081134607213	Yes
<i>dfrB7</i>	-0.0277538411037196	0.156363929834982	No
<i>dfrB8</i>	0.00409777458460094	0.834167959688196	No
<i>dfrB9</i>	0.00979369120889303	0.616830208156775	No
<i>ereA2</i>	-0.52182632736655	3.34029321251897e-124	Yes
<i>ereA3</i>	-0.197803879143846	3.89257920888751e-23	Yes
<i>fosC2</i>	-0.0221835760859636	0.257174057056693	No
<i>fosE</i>	-0.00581125339221667	0.766543168012975	No
<i>fosF</i>	0.0861928281406999	1.15120234940175e-05	Yes
<i>fosG</i>	0.0331580705944144	0.0904341953867629	No
<i>fosH</i>	-0.00534328353612449	0.784859712701249	No
<i>fosI</i>	-0.0825097066944309	2.66277641405159e-05	Yes
<i>fosK</i>	0.0608505463224285	0.00191632717639773	Yes
<i>fosL</i>	-0.0252310361958931	0.197517575993515	No
<i>fosM</i>	-0.0396851737554178	0.0427758911418548	Yes
<i>fosN</i>	0.0648599243238344	0.000944767321313457	Yes
<i>qacE</i>	0.142049077191674	6.86424941104712e-13	Yes
<i>qacF</i>	-0.0338839821201895	0.0836063556302897	No
<i>qacG</i>	0.0876761588803638	8.13788873233178e-06	Yes
<i>qacL</i>	-0.0258801780902848	0.186238838699504	No
<i>qacM</i>	0.107920747862606	4.24240449436048e-08	Yes
<i>sat2</i>	0.0551439712383824	0.00490990388112978	Yes
<i>smr2</i>	0.000464200310451162	0.981078644948404	No
<i>smr3</i>	-0.0106844777762089	0.585167844313377	No

Supplementary Table 7. Strains and plasmids used in this study. All strains used in this work were built in *E. coli* backgrounds otherwise stated. Strains corresponding to the OMM¹² consortium are numbered following DSM (German collection of microorganisms and cell cultures) classification.

Strain	Genetic background	Plasmid	ARC cloned (family)	Source
General purpose strains				
A072	MG1655	-	-	Lab collection
A093	DH5 α	-	-	"
A249	MG1655	pMBA empty vector	-	Hipólito et al. 2023
C381	DH5 α	pMBA empty vector	-	"
pMBA collection used for flow cytometry competition assays				
A223	MG1655	pMBA _{dfrA1}	<i>dfrA1</i> (dfr)	"
A224	MG1655	pMBA _{dfrA5}	<i>dfrA5</i> (dfr)	"
A225	MG1655	pMBA _{dfrA6}	<i>dfrA6</i> (dfr)	"
A226	MG1655	pMBA _{dfrA7}	<i>dfrA7</i> (dfr)	"
A241	MG1655	pMBA _{dfrA12}	<i>dfrA12</i> (dfr)	"
A227	MG1655	pMBA _{dfrA14}	<i>dfrA14</i> (dfr)	"
A228	MG1655	pMBA _{dfrA15}	<i>dfrA15</i> (dfr)	"
A229	MG1655	pMBA _{dfrA16}	<i>dfrA16</i> (dfr)	"
A230	MG1655	pMBA _{dfrA17}	<i>dfrA17</i> (dfr)	"
A231	MG1655	pMBA _{dfrA21}	<i>dfrA21</i> (dfr)	"
A500	MG1655	pMBA _{dfrA22}	<i>dfrA22</i> (dfr)	"
A244	MG1655	pMBA _{dfrA22.2}	<i>dfrA22.2</i> (dfr)	"
A232	MG1655	pMBA _{dfrA25}	<i>dfrA25</i> (dfr)	"
A233	MG1655	pMBA _{dfrA27}	<i>dfrA27</i> (dfr)	"
A613	MG1655	pMBA _{dfrA29}	<i>dfrA29</i> (dfr)	"
A248	MG1655	pMBA _{dfrA30}	<i>dfrA30</i> (dfr)	"
A234	MG1655	pMBA _{dfrA31}	<i>dfrA31</i> (dfr)	"
A235	MG1655	pMBA _{dfrA34}	<i>dfrA34</i> (dfr)	"
A242	MG1655	pMBA _{dfrA35}	<i>dfrA35</i> (dfr)	"
A236	MG1655	pMBA _{dfrB1}	<i>dfrB1</i> (dfr)	"
A245	MG1655	pMBA _{dfrB2}	<i>dfrB2</i> (dfr)	"
A246	MG1655	pMBA _{dfrB3}	<i>dfrB3</i> (dfr)	"
A237	MG1655	pMBA _{dfrB4}	<i>dfrB4</i> (dfr)	"
A238	MG1655	pMBA _{dfrB5}	<i>dfrB5</i> (dfr)	"
A239	MG1655	pMBA _{dfrB6}	<i>dfrB6</i> (dfr)	"
A240	MG1655	pMBA _{dfrB7}	<i>dfrB7</i> (dfr)	"
A247	MG1655	pMBA _{dfrB8}	<i>dfrB8</i> (dfr)	"
A243	MG1655	pMBA _{dfrB9}	<i>dfrB9</i> (dfr)	"
A390	MG1655	pMBA _{blaBEL-1}	<i>blaBEL-1</i> (bla)	"
A380	MG1655	pMBA _{blaGES-1}	<i>blaGES-1</i> (bla)	"
A387	MG1655	pMBA _{blaIMP-2}	<i>blaIMP-2</i> (bla)	"
A383	MG1655	pMBA _{blaIMP-31}	<i>blaIMP-31</i> (bla)	"
A441	MG1655	pMBA _{blaOXA-1}	<i>blaOXA-1</i> (bla)	"
A373	MG1655	pMBA _{blaOXA-2}	<i>blaOXA-2</i> (bla)	"
A381	MG1655	pMBA _{blaOXA-5}	<i>blaOXA-5</i> (bla)	"
A384	MG1655	pMBA _{blaOXA-9}	<i>blaOXA-9</i> (bla)	"
A374	MG1655	pMBA _{blaOXA-10}	<i>blaOXA-10</i> (bla)	"
A385	MG1655	pMBA _{blaOXA-20}	<i>blaOXA-20</i> (bla)	"
A382	MG1655	pMBA _{blaOXA-21}	<i>blaOXA-21</i> (bla)	"
A395	MG1655	pMBA _{blaOXA-46}	<i>blaOXA-46</i> (bla)	"
A375	MG1655	pMBA _{blaOXA-118}	<i>blaOXA-118</i> (bla)	"
A391	MG1655	pMBA _{blaOXA-129}	<i>blaOXA-129</i> (bla)	"
A376	MG1655	pMBA _{blaOXA-198}	<i>blaOXA-198</i> (bla)	"
A803	MG1655	pMBA _{blaPBL-1}	<i>blaPBL-1</i> (bla)	"
A388	MG1655	pMBA _{blaVIM-1}	<i>blaVIM-1</i> (bla)	"
A396	MG1655	pMBA _{blaVIM-2}	<i>blaVIM-2</i> (bla)	"
A389	MG1655	pMBA _{blaVIM-7}	<i>blaVIM-7</i> (bla)	"
A327	MG1655	pMBA _{aacA2}	<i>aacA2</i> (aa)	"
A266	MG1655	pMBA _{aacA3}	<i>aacA3</i> (aa)	"
A328	MG1655	pMBA _{aacA4}	<i>aacA4</i> (aa)	"
A267	MG1655	pMBA _{aacA7}	<i>aacA7</i> (aa)	"

A268	MG1655	pMBA _{aacA8}	<i>aacA8</i> (aa)	“
A263	MG1655	pMBA _{aacA16}	<i>aacA16</i> (aa)	“
A543	MG1655	pMBA _{aacA17}	<i>aacA17</i> (aa)	“
A264	MG1655	pMBA _{aacA27}	<i>aacA27</i> (aa)	“
A256	MG1655	pMBA _{aacA28}	<i>aacA28</i> (aa)	“
A257	MG1655	pMBA _{aacA29}	<i>aacA29</i> (aa)	“
A270	MG1655	pMBA _{aacA30}	<i>aacA30</i> (aa)	“
B657	MG1655	pMBA _{aacA31}	<i>aacA31</i> (aa)	“
A272	MG1655	pMBA _{aacA34}	<i>aacA34</i> (aa)	“
A329	MG1655	pMBA _{aacA35}	<i>aacA35</i> (aa)	“
A258	MG1655	pMBA _{aacA37}	<i>aacA37</i> (aa)	“
A603	MG1655	pMBA _{aacA38}	<i>aacA38</i> (aa)	“
A273	MG1655	pMBA _{aacA42}	<i>aacA42</i> (aa)	“
C117	MG1655	pMBA _{aacA43}	<i>aacA43</i> (aa)	“
A265	MG1655	pMBA _{aacA45}	<i>aacA45</i> (aa)	“
A274	MG1655	pMBA _{aacA47}	<i>aacA47</i> (aa)	“
A259	MG1655	pMBA _{aacA48}	<i>aacA48</i> (aa)	“
B656	MG1655	pMBA _{aacA49}	<i>aacA49</i> (aa)	“
A260	MG1655	pMBA _{aacA50}	<i>aacA50</i> (aa)	“
A261	MG1655	pMBA _{aacA51}	<i>aacA51</i> (aa)	“
A326	MG1655	pMBA _{aacA52}	<i>aacA52</i> (aa)	“
B655	MG1655	pMBA _{aacA54}	<i>aacA54</i> (aa)	“
A262	MG1655	pMBA _{aacA56}	<i>aacA56</i> (aa)	“
A303	MG1655	pMBA _{aacA59}	<i>aacA59</i> (aa)	“
A302	MG1655	pMBA _{aacA61}	<i>aacA61</i> (aa)	“
A566	MG1655	pMBA _{aacA64}	<i>aacA64</i> (aa)	“
A331	MG1655	pMBA _{aacAX}	<i>aacAX</i> (aa)	“
A308	MG1655	pMBA _{aacC1}	<i>aacC1</i> (aa)	“
A304	MG1655	pMBA _{aacC2}	<i>aacC2</i> (aa)	“
B625	MG1655	pMBA _{aacC3}	<i>aacC3</i> (aa)	“
A320	MG1655	pMBA _{aacC4}	<i>aacC4</i> (aa)	“
A305	MG1655	pMBA _{aacC5}	<i>aacC5</i> (aa)	“
A306	MG1655	pMBA _{aacC6}	<i>aacC6</i> (aa)	“
A332	MG1655	pMBA _{aacC11}	<i>aacC11</i> (aa)	“
A309	MG1655	pMBA _{aacC13}	<i>aacC13</i> (aa)	“
A311	MG1655	pMBA _{aadA1}	<i>aadA1</i> (aa)	“
A333	MG1655	pMBA _{aadA2}	<i>aadA2</i> (aa)	“
A319	MG1655	pMBA _{aadA4}	<i>aadA4</i> (aa)	“
A313	MG1655	pMBA _{aadA5}	<i>aadA5</i> (aa)	“
A321	MG1655	pMBA _{aadA6}	<i>aadA6</i> (aa)	“
A397	MG1655	pMBA _{aadA7}	<i>aadA7</i> (aa)	“
A315	MG1655	pMBA _{aadA10}	<i>aadA10</i> (aa)	“
A312	MG1655	pMBA _{aadA11}	<i>aadA11</i> (aa)	“
A322	MG1655	pMBA _{aadA13}	<i>aadA13</i> (aa)	“
A316	MG1655	pMBA _{aadA16}	<i>aadA16</i> (aa)	“
A318	MG1655	pMBA _{aadA24}	<i>aadA24</i> (aa)	“
A604	MG1655	pMBA _{aadA28}	<i>aadA28</i> (aa)	“
A314	MG1655	pMBA _{aadA29}	<i>aadA29</i> (aa)	“
A398	MG1655	pMBA _{aadA34}	<i>aadA34</i> (aa)	“
A292	MG1655	pMBA _{aadB}	<i>aadB</i> (aa)	“
A422	MG1655	pMBA _{aphA15}	<i>aphA15</i> (aa)	“
C116	MG1655	pMBA _{aphA16}	<i>aphA16</i> (aa)	“
A293	MG1655	pMBA _{sat2}	<i>sat2</i> (aa)	“
A368	MG1655	pMBA _{arr2}	<i>arr2</i> (mix)	“
A334	MG1655	pMBA _{arr5}	<i>arr5</i> (mix)	“
A363	MG1655	pMBA _{arr6}	<i>arr6</i> (mix)	“
A440	MG1655	pMBA _{arr7}	<i>arr7</i> (mix)	“
A364	MG1655	pMBA _{arr8b}	<i>arr8b</i> (mix)	“
A335	MG1655	pMBA _{catB2}	<i>catB2</i> (mix)	“
A336	MG1655	pMBA _{catB3}	<i>catB3</i> (mix)	“
A365	MG1655	pMBA _{catB5}	<i>catB5</i> (mix)	“
A625	MG1655	pMBA _{catB6}	<i>catB6</i> (mix)	“
A393	MG1655	pMBA _{catB10}	<i>catB10</i> (mix)	“
A338	MG1655	pMBA _{ereA2}	<i>ereA2</i> (mix)	“
A423	MG1655	pMBA _{ereA3}	<i>ereA3</i> (mix)	“
A657	MG1655	pMBA _{fosC2}	<i>fosC2</i> (mix)	“

A339	MG1655	pMBA _{fosE}	<i>fosE</i> (mix)	"
A624	MG1655	pMBA _{fosF}	<i>fosF</i> (mix)	"
A354	MG1655	pMBA _{fosG}	<i>fosG</i> (mix)	"
A355	MG1655	pMBA _{fosH}	<i>fosH</i> (mix)	"
A356	MG1655	pMBA _{fosI}	<i>fosI</i> (mix)	"
A626	MG1655	pMBA _{fosK}	<i>fosK</i> (mix)	"
A621	MG1655	pMBA _{fosL}	<i>fosL</i> (mix)	"
A622	MG1655	pMBA _{fosM}	<i>fosM</i> (mix)	"
A627	MG1655	pMBA _{fosN}	<i>fosN</i> (mix)	"
A337	MG1655	pMBA _{smr1}	<i>smr1</i> (mix)	"
A359	MG1655	pMBA _{smr2}	<i>smr2</i> (mix)	"
A366	MG1655	pMBA _{smr3}	<i>smr3</i> (mix)	"
A367	MG1655	pMBA _{qacE}	<i>qacE</i> (mix)	"
B091	MG1655	pMBA _{qacEΔsul1}	<i>qacEΔsul1</i> (mix)	"
C382	DH5a	pMBA _{qacEΔsul1}	<i>qacEΔsul1</i> (mix)	"
A323	MG1655	pMBA _{qacF}	<i>qacF</i> (mix)	"
A357	MG1655	pMBA _{qacG}	<i>qacG</i> (mix)	"
A324	MG1655	pMBA _{qacH}	<i>qacH</i> (mix)	"
A623	MG1655	pMBA _{qacK}	<i>qacK</i> (mix)	"
A325	MG1655	pMBA _{qacL}	<i>qacL</i> (mix)	"
A358	MG1655	pMBA _{qacM}	<i>qacM</i> (mix)	"
Quantitation of the cost of GFP expression				
A696	MG1655	pMBA _{ΔmetGFP} KO	-	This study
A744	MG1655	pMBA _{aacA59} ΔmetGFP KO	<i>aacA59</i> (aa)	"
A745	MG1655	pMBA _{aacA8} ΔmetGFP KO	<i>aacA8</i> (aa)	"
A746	MG1655	pMBA _{aadB} ΔmetGFP KO	<i>aadB</i> (aa)	"
A747	MG1655	pMBA _{aacC2} ΔmetGFP KO	<i>aacC2</i> (aa)	"
A748	MG1655	pMBA _{aacA28} ΔmetGFP KO	<i>aacA28</i> (aa)	"
A749	MG1655	pMBA _{aacA52} ΔmetGFP KO	<i>aacA52</i> (aa)	"
A750	MG1655	pMBA _{aacA30} ΔmetGFP KO	<i>aacA30</i> (aa)	"
A751	MG1655	pMBA _{aadA24} ΔmetGFP KO	<i>aadA24</i> (aa)	"
A752	MG1655	pMBA _{aadA13} ΔmetGFP KO	<i>aadA13</i> (aa)	"
A753	MG1655	pMBA _{aacC13} ΔmetGFP KO	<i>aacC13</i> (aa)	"
A754	MG1655	pMBA _{dfrA35} ΔmetGFP KO	<i>dfrA35</i> (dfr)	"
A755	MG1655	pMBA _{dfrB4} ΔmetGFP KO	<i>dfrB4</i> (dfr)	"
A756	MG1655	pMBA _{dfrA22.2} ΔmetGFP KO	<i>dfrA22.2</i> (dfr)	"
A757	MG1655	pMBA _{dfrA16} ΔmetGFP KO	<i>dfrA16</i> (dfr)	"
A758	MG1655	pMBA _{dfrA14} ΔmetGFP KO	<i>dfrA14</i> (dfr)	"
A759	MG1655	pMBA _{dfrA34} ΔmetGFP KO	<i>dfrA34</i> (dfr)	"
Mice and long-term competitions				
B878	MG1655	pMBA _{ΔGFP}	-	"
B880	MG1655	pMBA _{ereA2} ΔGFP	<i>ereA2</i> (mix)	"
B881	MG1655	pMBA _{dfrA31} ΔGFP	<i>dfrA31</i> (dfr)	"
B882	MG1655	pMBA _{dfrA21} ΔGFP	<i>dfrA21</i> (dfr)	"
B883	MG1655	pMBA _{aacA7} ΔGFP	<i>aacA7</i> (aa)	"
B886	MG1655	pMBA _{blaOXA-10} ΔGFP	<i>blaOXA-10</i> (bla)	"
26074	YL2	-	-	<i>Brugiroux et al, 2016</i>
28989	YL27	-	-	"
26085	I48	-	-	"
26109	YL45	-	-	"
26127	YL44	-	-	"
32036	KB1	-	-	"
32035	I49	-	-	"
26114	YL32	-	-	"
26115	YL58	-	-	"
26117	YL31	-	-	"
26090	KB18	-	-	"
26113	I46	-	-	"

Supplementary Table 8. Primers and probes used in this study.

Primer/Probe	Sequence (5' → 3')	Description
<i>int</i> R bb	CTTTGTTTTAGGGCGACTGC	pMBA linearisation
<i>gfp</i> F bb	TTAGGCGTCGACGCTGCA	
gBlock F	GCAGTCGCCCTAAAACAAAG	ARC amplification
gBlock R	GCTGCAGCGTCGACGCCTAA	
<i>int</i> F	AACGCAATTACAGAAATGCCTCGACTTCGC	pMBA sequencing
<i>gfp</i> R	AAAGCGCTGTCTAGACTATT	
<i>gfp</i> 2.0 R	CTCGATTCTATTAACAAGGG	
Δ met <i>gfp</i> F	GTAATATAGAGTAAATGAGAAGAACTTTT	pMBA <i>gfp</i> KO and Δ met
Δ met <i>gfp</i> R	ATTTACTCTATATTTACCTCCTTTATATTG	
Δ <i>gfp</i> F	TGCAATATAAAATTGTCGGCAGCTAAGAGG	pMBA <i>gfp</i> deletion
Δ <i>gfp</i> R	GCCGACAATTTTATATTGCAATCGCTGCAG	
Isol46 Exonucl.2 F	CGGATCGTAAAGCTCTGTTGTAAG	I46 qPCR (Brugiroux et al, 2016)
Isol46 Exonucl.3 R	GCTACCGTCACTCCCATAGCA	
Probe3 Isol46	FAM-AAGAACGGCTCATAGAGG-BHQ1	
Isol49 Exonucl. F	GCACTGGCTCAACAGATTGATG	I49 qPCR (Brugiroux et al, 2016)
Isol49 Exonucl. R	CCGCCACTCACTGGTGATC	
Probe Isol49	HEX-CTTGCACCTGATTGACGA-BHQ1	
YL58 Exonucl. F	GAAGAGCAAGTCTGATGTGAAAGG	YL58 qPCR (Brugiroux et al, 2016)
YL58 Exonucl. R	CGGCACTCTAGAAAAACAGTTTCC	
Probe YL58	FAM-TAACCCAGGACTGCAT-BHQ1	
YL27 Exonucl.2 F	TCAAGTCAGCGGTAAAAATTCCG	YL27 qPCR (Brugiroux et al, 2016)
YL27 Exonucl.2 R	CCCCTCAAGAACATCAGTTTCAA	
Probe2 YL27	HEX-CAACCCGTCGTGCC-BHQ1	
YL31 Exonucl.2 F	AGGCGGGATTGCAAGTCA	YL31 qPCR (Brugiroux et al, 2016)
YL31 Exonucl.3 R	CCAGCACTCAAGAACTACAGTTTCA	
Probe2 YL31	FAM-CAACCTCCAGCCTGC-BHQ1	
YL32 Exonucl.2 F	AATACCGCATAAGCGCACAGT	YL32 qPCR (Brugiroux et al, 2016)
YL32 Exonucl.2 R	CCATCTCACACCACCAAAGTTT	
Probe2 YL32	HEX-CGCATGGCAGTGTGT-BHQ1	
KB1 Exonucl. F	CTTCTTTCCTCCCGAGTGCTT	KB1 qPCR (Brugiroux et al, 2016)
KB1 Exonucl. R	CCCCTCTGATGGGTAGGTTACC	
Probe KB1	FAM-CACTCAATTGGAAAGAGGAG-BHQ1	
YL2 Exonucl. F	GGTGAGTAATGCGTGACCAA	YL2 qPCR (Brugiroux et al, 2016)
YL2 Exonucl. R	CGGAGCATCCGGTATTACCA	
Probe2 YL2	HEX-CGGAATAGCTCCTGGAAA-BHQ1	
KB18 Exonucl.2 F	TGGCAAGTCAGTAGTGAAATCCA	KB18 qPCR (Brugiroux et al, 2016)
KB18 Exonucl.2 R	TCACTCAAGCTCGACAGTTTCAA	
Probe2 KB18	FAM-CTTAACCCATGAACTGC-BHQ1	
YL44 Exonucl. F	CGGGATAGCCCTGGGAAA	YL44 qPCR (Brugiroux et al, 2016)
YL44 Exonucl. R	GCGCATTGCTGCTTAACTTT	
Probe YL44	HEX-TGGGATTAATACCGCATAGTA-BHQ1	
YL45 Exonucl. F	AGACGGCCTTCGGGTTGTA	YL45 qPCR (Brugiroux et al, 2016)
YL45 Exonucl. R	CGTCATCGTCTATCGGTATTATCAA	
Probe YL44	FAM-ACCACTTTTGTAGAGAACGA-BHQ1	
Isol48 Exonucl. F	GCCAGCATGGGAGTTTGCT	I48 qPCR (Brugiroux et al, 2016)
Isol48 Exonucl. R	TTATCGGCAGGTTGGATACGT	
Probe Isol48	HEX-CAAACCTCCGATGGCGAC-BHQ1	
<i>E. coli</i> Exonucl. F	GGACCTTCGGGCTCTTG	<i>E. coli</i> qPCR (Brugiroux et al, 2016)
<i>E. coli</i> Exonucl. R	CCTTACCCACCTACTAGCTAATCC	
Probe <i>E. coli</i>	FAM-ATCGGATGTGCCAGAT-BHQ1	