Supplementary Materials

A microfluidic biodisplay

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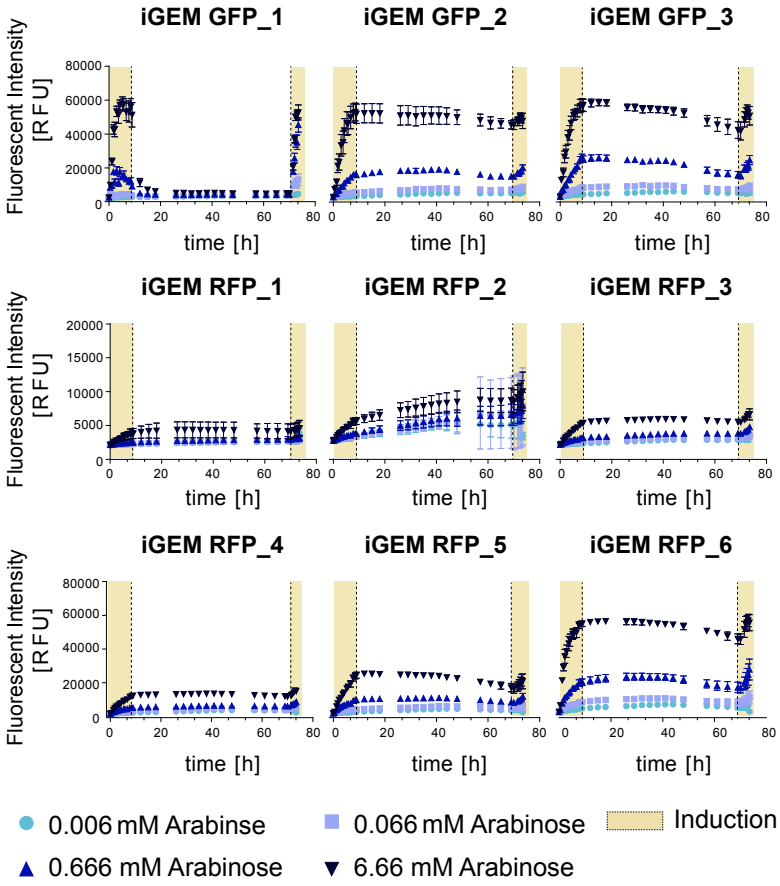

Figure S1. Biodisplay for strain characterization at 37°C. Fluorescent intensity of GFP or RFP expression of nine different arabinose sensitive *E. coli* strains. The cells were induced twice with 4 different concentrations of arabinose (0.006 mM, 0.066 mM, 0.666 mM and 6.66 mM). The yellow background indicates the induction intervals. The microfluidic chip was heated to 37°C during the experiment.

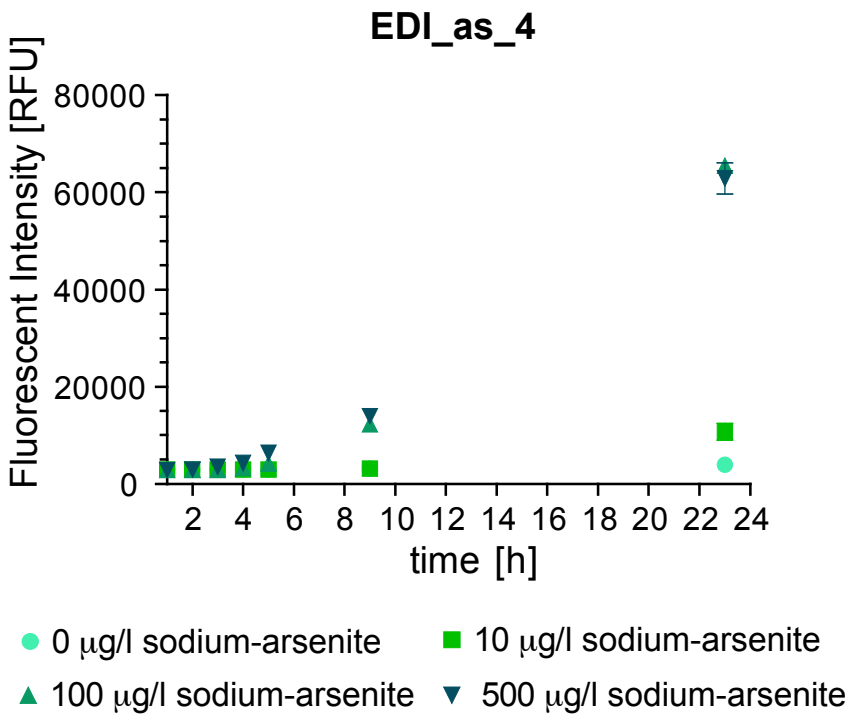

Figure S2. Arsenic-responsive *E. coli,* EDI_as_4, was spotted on the chip and 4 different concentrations of sodium-arsenite in LB were sampled for 24 hours. GFP expression was monitored over time using an epifluorescent microscope.

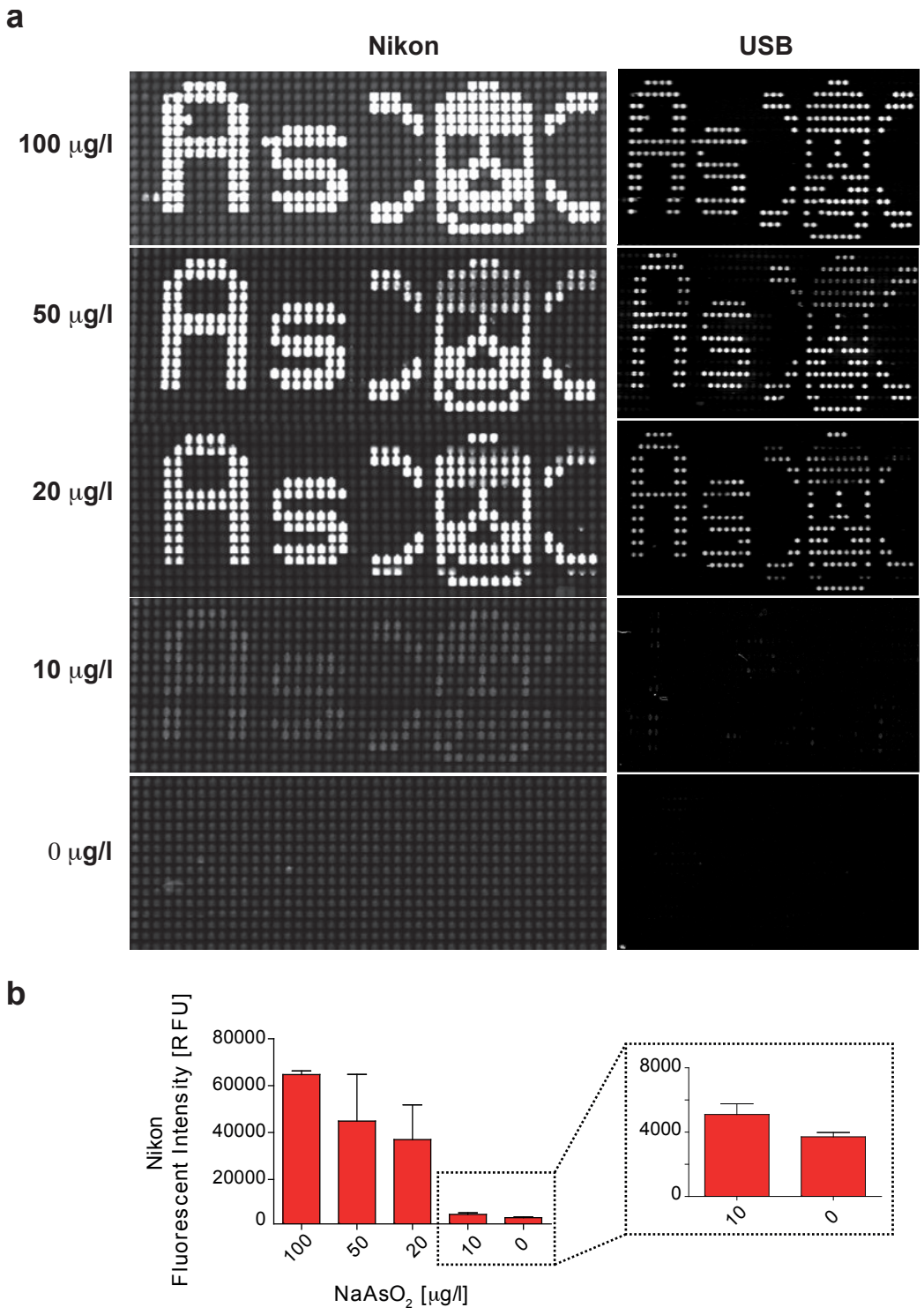

Figure S3. Arsenic biodisplay. (**a**) Fluorescent images taken using an epifluorescent and USB microscope after 24 hours of induction with different concentrations of sodium-arsenite (100 μg/l, 50 μg/l, 20 μg/l, 10 μg/l and 0 μg/l). Each concentration was sampled in different devices. (**b**) Quantitation of the fluorescent signal, after 24 hours of induction and measured with the epifluorescent microscope.

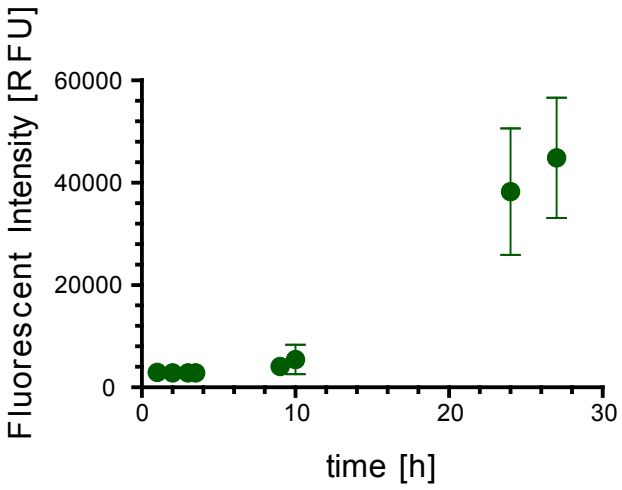

Figure S4. Arsenic biodisplay. Arsenic-responsive *E. coli* was spotted in a "As" and a "skull and crossbones" pattern. 20 µg/l of sodium-arsenite in tap water was sampled and GFP expression monitored over time using an epifluorescent microscope.

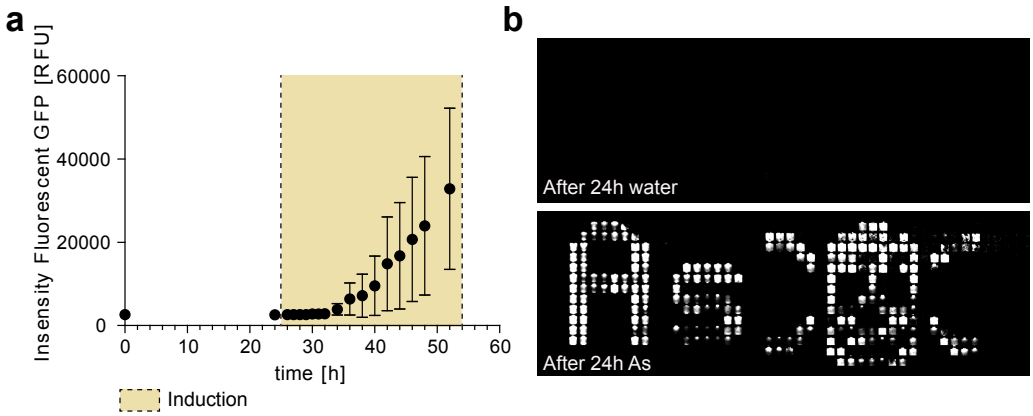

Figure S5. Delayed arsenite sampling. a) Arsenic-responsive *E. coli* was spotted in a "As" and a "skull and crossbones" pattern. After sampling water for 24 hours, water containing 50 µg/l of sodium-arsenite was sampled. The GFP signal was monitored using an epifluorescent microscope. b) Fluorescent images of the device after 24 hours of water sampling (top) and others 24 hours of water containing sodium-arsenite.

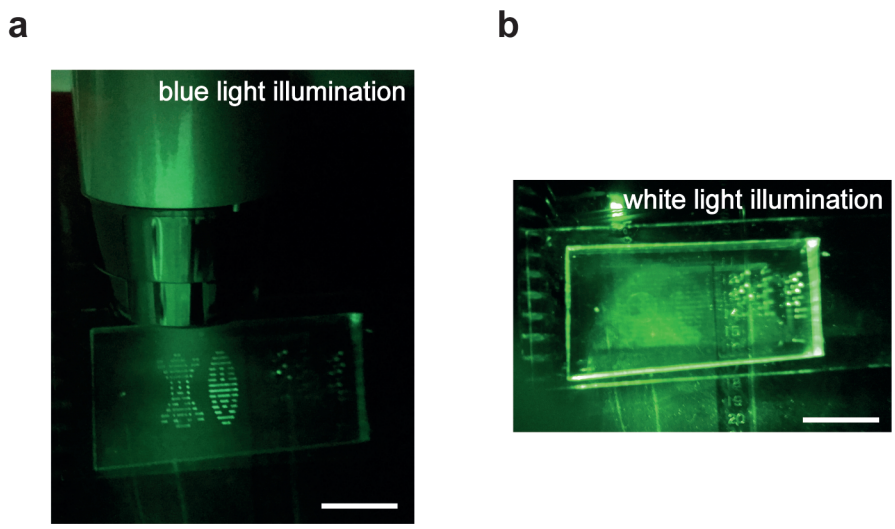

Figure S6. Cellphone image acquisition. (**a**) The microfluidic chip was illuminated using the LEDs of a USB microscope (excitation at 480 nm), a band-pass filter centered at 530nm with a 40 nm bandwidth was placed in front of the camera of the cellphone. (**b**) The same device was illuminated by white light and imaged using the cellphone and emission filter as in (**a**). Scale bar 1cm.

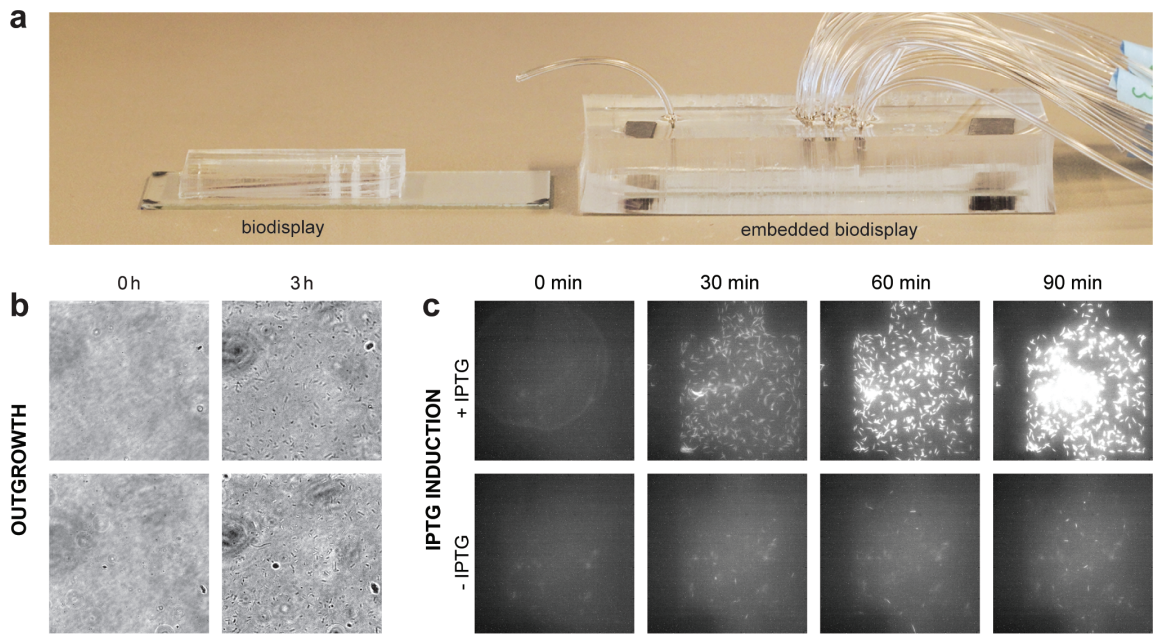

Figure S7. Embedded spore biodisplay. **(a)** Photo comparing the spore biodisplay and the embedded PDMS spore biodisplay. **(b)** Bright-field images of magnified center part of spotted chambers showing spore germination. Images are acquired immediately after spot resuspension with medium and 3 hours incubation at 37°C. **(c)** Time-lapse images of germinated P*hy-spank*-mCherry *B. subtilis* spores after induction with 1 µM IPTG.

Identifier	Name	Host Strain	Resistance	Inducer	Reporter
BBa_I13517	iGEM RFP_1	*E.coli* DH5α	Chloramphenicol	Arabinose	RFP
BBa_K1333301	iGEM RFP_2	*E.coli* DH5α	Chloramphenicol	Arabinose	RFP
BBa_K1333300	iGEM RFP_3	*E.coli* DH5α	Chloramphenicol	Arabinose	RFP
BBa_K577004	iGEM RFP_4	*E.coli* DH5α	Chloramphenicol	Arabinose	RFP
BBa_K577882	iGEM RFP_5	*E.coli* DH5α	Chloramphenicol	Arabinose	RFP
BBa_I13516	iGEM RFP_6	*E.coli* DH5α	Chloramphenicol	Arabinose	RFP
BBa_K750000	iGEM GFP_1	*E.coli* DH5α	Chloramphenicol	Arabinose	GFP
BBa_K584000	iGEM GFP_2	*E.coli* DH5α	Chloramphenicol	Arabinose	GFP
BBa_K577881	iGEM GFP_3	*E.coli* DH5α	Chloramphenicol	Arabinose	GFP
pBW101ParsR-gfp (78636)	EDI_as_1	*E.coli* DH5α	Kanamycin	Arsenic	GFP
pBW102ParsR-Amp32C (78637)	EDI_as_2	*E.coli* DH5α	Kanamycin	Arsenic	GFP
pBW103ParsR-Amp30C (78638)	EDI_as_3	*E.coli* DH5α	Kanamycin	Arsenic	GFP
pBW300ParsR-Amp32T (78652)	EDI_as_4	*E.coli* DH5α	Kanamycin	Arsenic	GFP
pIIUN gfp	UNIL_1	*E.coli* DH5α	Kanamycin	Arsenic	GFP
pAAUN gfp	UNIL_2	*E.coli* DH5α	Kanamycin	Arsenic	GFP
pVUN gfp	UNIL_3	*E.coli* DH5α	Kanamycin	Arsenic	GFP

pLtet0UN gfp	UNIL_4	*E.coli* DH5α	Kanamycin	Arsenic	GFP
pPR arsR abs gfp	UNIL_5	*E.coli* DH5α	Kanamycin	Arsenic	GFP
BGSC 3A40	Bacillus subtilis subsp. Subtilis amyE::Physpank-mCherry	*B. subtilis* subsp. *subtilis*		IPTG	mCherry
BGSC 3A39	Bacillus subtilis subsp. Subtilis amyE::Physpank-GFP	*B. subtilis* subsp. *subtilis*		IPTG	GFP

Table S1. List of plasmids and strains used in this work.