Supplementary Materials

A microfluidic biodisplay

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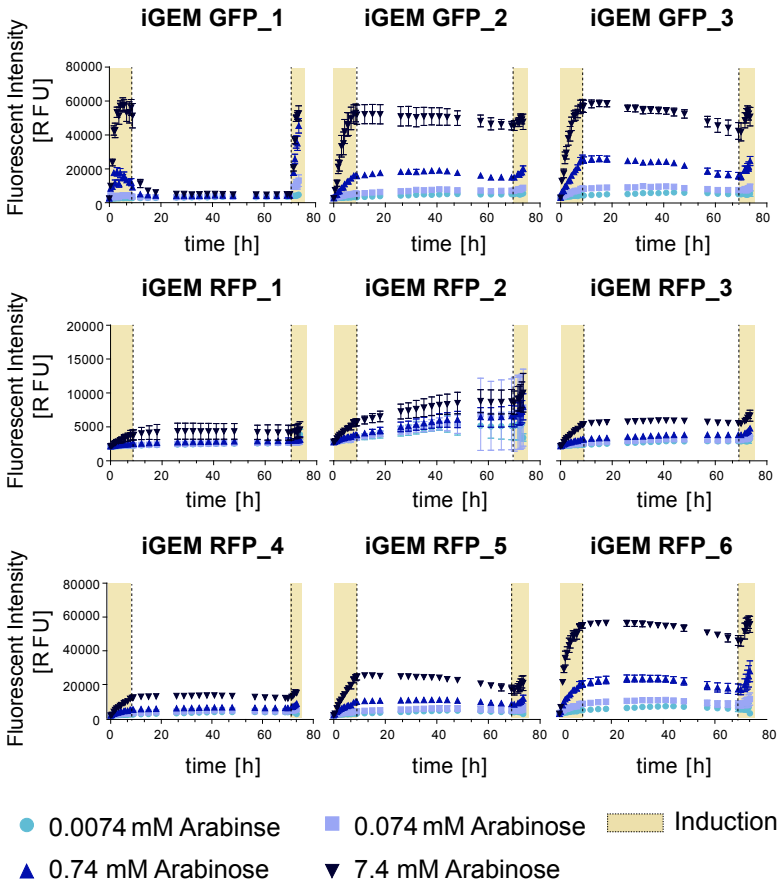
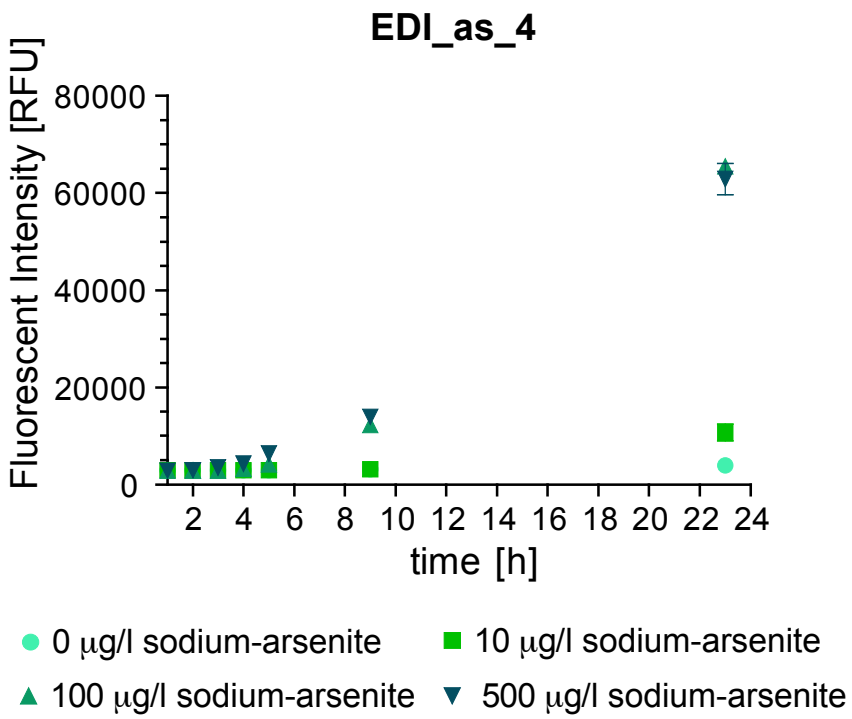
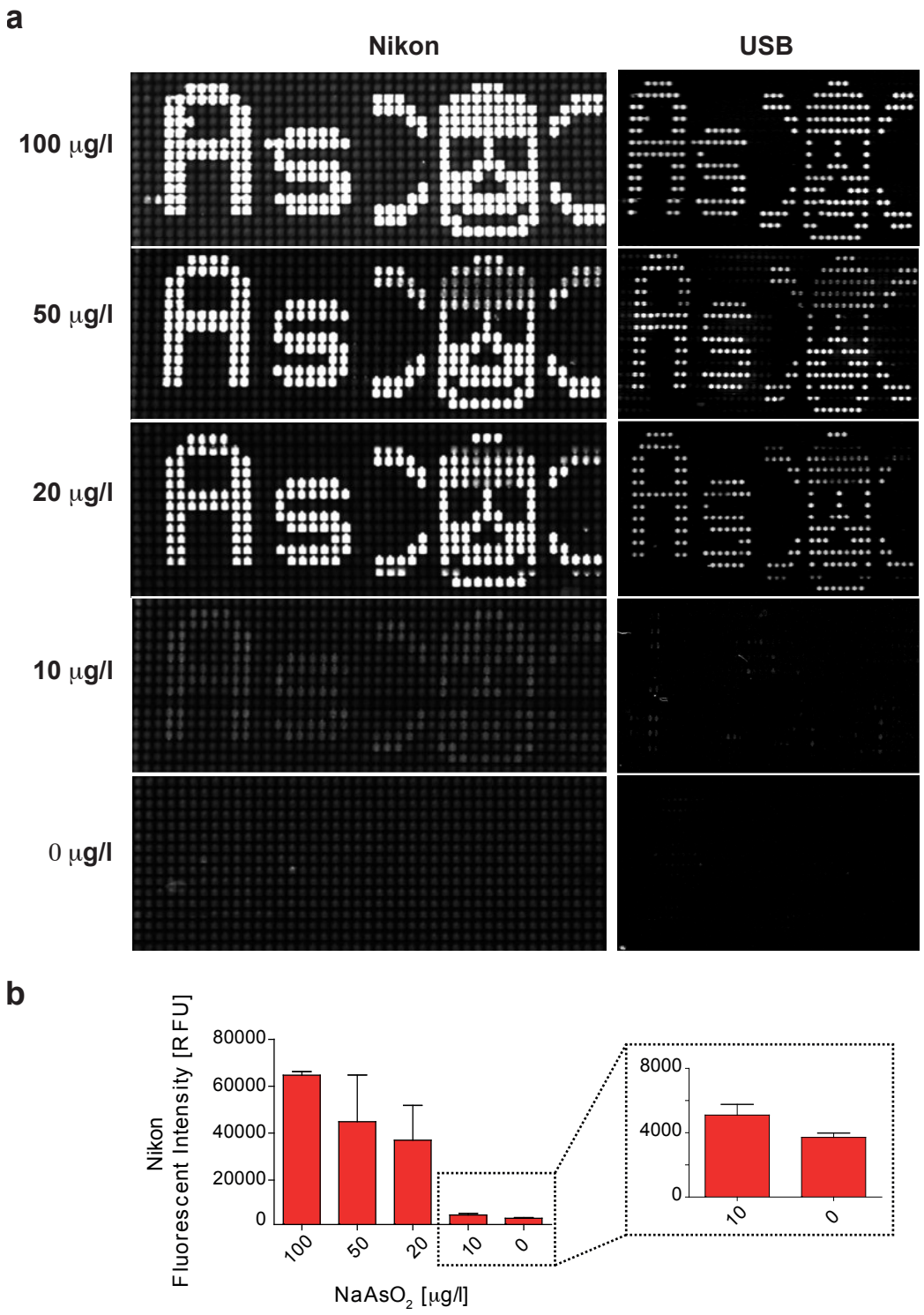


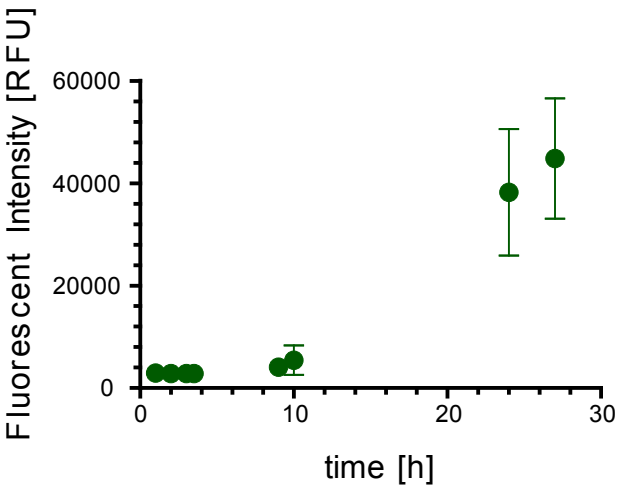
Supplementary Figure 1. Biodisplay for strain characterization at 37°C. Fluorescent intensity of GFP or RFP expression of nine different arabinose sensitive *E. coli* strains. The cells were induced twice with 4 different concentrations of arabinose (0.0074 mM, 0.074 mM, 0.74 mM and 7.4 mM). The yellow background indicates the induction intervals. The microfluidic chip was heated to 37°C during the experiment.



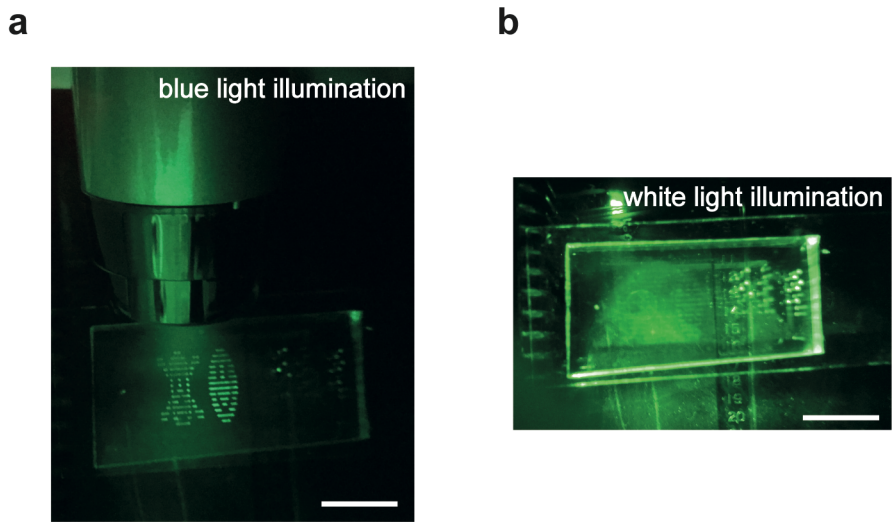
Supplementary Figure 2. Arsenic-responsive *E. coli,* EDI_as_4, was spotted on the chip and 4 different concentrations of sodium-arsenite in LB were sampled for 24 hours. GFP expression was monitored over time using a Nikon microscope.



Supplementary Figure 3. Arsenic biodisplay. (**a**) Fluorescent images taken using Nikon 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 Nikon microscope.



Supplementary Figure 4. 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 a Nikon microscope.



Supplementary Figure 5. 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.

Identifier	Name	Resistance	Inducer	Reporter
BBa_I13517	iGEM RFP_1	Chloramphenicol	Arabinose	RFP
BBa_K1333301	iGEM RFP_2	Chloramphenicol	Arabinose	RFP
BBa_K1333300	iGEM RFP_3	Chloramphenicol	Arabinose	RFP
BBa_K577004	iGEM RFP_4	Chloramphenicol	Arabinose	RFP
BBa_K577882	iGEM RFP_5	Chloramphenicol	Arabinose	RFP
BBa_I13516	iGEM RFP_6	Chloramphenicol	Arabinose	RFP
BBa_K750000	iGEM GFP_1	Chloramphenicol	Arabinose	GFP
BBa_K584000	iGEM GFP_2	Chloramphenicol	Arabinose	GFP
BBa_K577881	iGEM GFP_3	Chloramphenicol	Arabinose	GFP
pBW101ParsR-gfp (78636)	EDI_as_1	Kanamycin	Arsenic	GFP
pBW102ParsR-Amp32C (78637)	EDI_as_2	Kanamycin	Arsenic	GFP
pBW103ParsR-Amp30C (78638)	EDI_as_3	Kanamycin	Arsenic	GFP
pBW300ParsR-Amp32T (78652)	EDI_as_4	Kanamycin	Arsenic	GFP
pIIUN gfp	UNIL_1	Kanamycin	Arsenic	GFP
pAAUN gfp	UNIL_2	Kanamycin	Arsenic	GFP
pVUN gfp	UNIL_3	Kanamycin	Arsenic	GFP
pLtet0UN gfp	UNIL_4	Kanamycin	Arsenic	GFP
pPR arsR abs gfp	UNIL_5	Kanamycin	Arsenic	GFP
BGSC 3A40	Bacillus subtilis subsp. Subtilis amyE::Physpank-mCherry		IPTG	mCherry
BGSC 3A39	Bacillus subtilis subsp. Subtilis amyE::Physpank-GFP		IPTG	GFP

Supplementary Table 1. List of plasmids and strains used in this work.