

## Background:

“All of the 2017 iGEM teams are invited and encouraged to participate in the Fourth International InterLaboratory Measurement Study in synthetic biology.” The goal of our team is to use the InterLab protocol and Measurement Kit provided by iGEM official to do measurements which can help to establish a GFP measurement protocol based on engineering principles that anyone with a plate reader can use in their lab. The specific task for us is to measure GFP fluorescence and standard curve by using plate reader.

## Materials & Methods

### Plasmids used

Kit Plate 7

Positive Control (BBa\_I20270): well 21B

Negative Control (BBa\_R0040): well 21D

Test Device 1 (BBa\_J364000): well 21F

Test Device 2 (BBa\_J364001): well 21H

Test Device 3 (BBa\_J364002): well 21J

Test Device 4 (BBa\_J364003): well 21L

Test Device 5 (BBa\_J364004): well 21N

Test Device 6 (BBa\_J364005): well 21P

### Strain used

Escherichia coli DH5 $\alpha$

### Materials

FITC Standard: one tube with dried down FITC for creating a FITC standard

- LUDOX: one tube with 30% colloidal silica suspended in 1mL of water
- 1xPBS (phosphate buffered saline)
- LB (Luria Bertani) media
- Chloramphenicol (stock concentration 25 mg/mL dissolved in EtOH)
- 50 ml Falcon tube (or equivalent) or 250 ml shake flask for cell growth
- 1.5 ml eppendorf tubes for sample storage
- Ice bucket with ice
- Pipettes

- 96 well plate

## Machines

Enspire 2300-001M  
Sigma Laborzentrifugen  
Thermo Scientific Nanodrop 2000  
EVOS AMG microscope

## Software

Microsoft Excel

## Methods

Calibration  
OD600 Reference point  
FITC fluorescence standard curve  
Test Device 1 (BBa\_J364000): well 21F  
Test Device 2 (BBa\_J364001): well 21H  
Test Device 3 (BBa\_J364002): well 21J  
Test Device 4 (BBa\_J364003): well 21L  
Test Device 5 (BBa\_J364004): well 21N  
Test Device 6 (BBa\_J364005): well 21P

## Cell measurement

Transformation  
Measurements

## Protocols

Please click the link:

[http://2017.igem.org/Competition/InterLab\\_Study](http://2017.igem.org/Competition/InterLab_Study)

## Results

### 1. OD600 reference point

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LUDOX-HS40
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H2O
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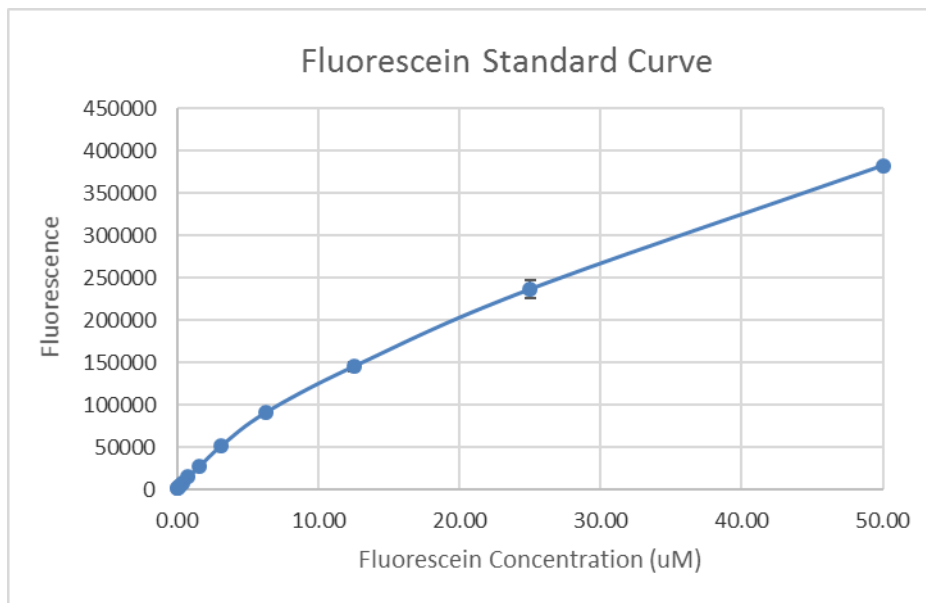
Replicate 1	0.063	0.031
Replicate 2	0.048	0.031
Replicate 3	0.041	0.033
Replicate 4	0.057	0.033
Arith. Mean	0.05225	0.032
Corrected Abs600	0.02025	
Reference OD600	0.0425	
OD600/Abs600	2.098765432	

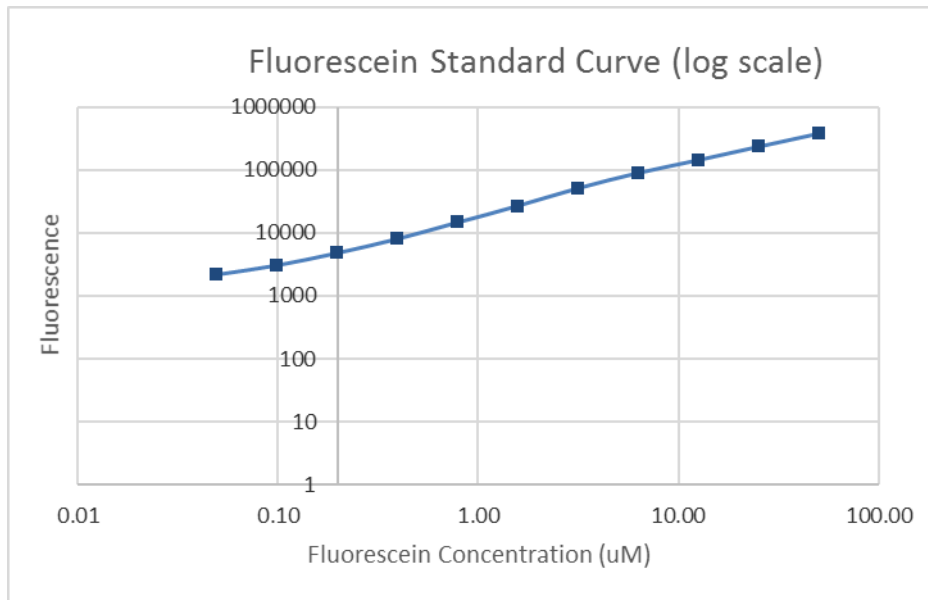
## 2. Fluorescein standard curve

### 2.1 Data

uM Fluorescein	Replicate 1	Replicate 2	Replicate 3	Replicate 4	Arith. Mean	Arith. Std.Dev.
<b>50.00</b>	384788	382984	380298	380979	382262.25	2033.498197
<b>25</b>	250160	230063	239729	225818	236442.5	10840.49367
<b>12.5</b>	141807	151654	141049	146454	145241	4897.725935
<b>6.25</b>	89704	89118	91826	92217	90716.25	1534.367269
<b>3.125</b>	49078	48143	55100	54197	51629.5	3526.200079
<b>1.5625</b>	25978	27987	26854	27456	27068.75	861.9742359
<b>0.78125</b>	15399	15677	13745	14401	14805.5	894.4337128
<b>0.390625</b>	8431	7899	7908	8200	8109.5	255.9068841
<b>0.1953125</b>	5149	4607	4751	4884	4847.75	230.4971077
<b>0.09765625</b>	3195	2968	3124	3081	3092	95.09644227
<b>0.048828125</b>	2136	2340	2145	2203	2206	94.13819629
<b>0</b>	1325	1344	1424	1290	1345.75	56.75899341

### 2.2 Figure





### 3. Calculate Target Dilution

#### 3.1 Colony 1

target Abs600	<b>0.02</b>		
target volume (mL)	<b>10</b>		
		Volume of Preloading Culture	Volume of Preloading Media
sample	Abs600 Reading		
positive control	0.189	1.058201058	8.941798942
negative control	0.297	0.673400673	9.326599327
device 1	0.289	0.692041522	9.307958478
device 2	0.378	0.529100529	9.470899471
device 3	0.263	0.760456274	9.239543726
device 4	0.268	0.746268657	9.253731343
device 5	0.308	0.649350649	9.350649351
device 6	0.25	0.8	9.2
media+chl			

#### 3.2 Colony 2

target Abs600	<b>0.02</b>		
target volume (mL)	<b>10</b>		
		Volume of Preloading Culture	Volume of Preloading Media
sample	Abs600 Reading		
positive control	0.391	0.511508951	9.488491049
negative control	0.265	0.754716981	9.245283019
device 1	0.453	0.441501104	9.558498896
device 2	0.215	0.930232558	9.069767442
device 3	0.198	1.01010101	8.98989899
device 4	0.113	1.769911504	8.230088496
device 5	0.356	0.561797753	9.438202247
device 6	0.266	0.751879699	9.248120301
media+chl			

#### 4. Raw Plate Reader Measurements

##### 4.1 Hour 0

##### 4.1.1 Raw Abs600

Sample set:	Replicate 1	Replicate 2	Replicate 3	Replicate 4
Negative Control (Colony 1)	0.07	0.068	0.073	0.07
Negative Control (Colony 2)	0.076	0.079	0.079	0.078
Positive Control (Colony 1)	0.07	0.073	0.064	0.072
Positive Control (Colony 2)	0.075	0.075	0.078	0.076
Test Device 1: (Colony 1)	0.074	0.074	0.075	0.106
Test Device 1: (Colony 2)	0.084	0.075	0.076	0.076
Test Device 2: (Colony 1)	0.074	0.081	0.074	0.076
Test Device 2: (Colony 2)	0.079	0.158	0.079	0.081
Test Device 3: (Colony 1)	0.082	0.085	0.086	0.088
Test Device 3: (Colony 2)	0.087	0.08	0.082	0.08
Test Device 4: (Colony 1)	0.066	0.066	0.067	0.067
Test Device 4: (Colony 2)	0.069	0.068	0.065	0.069
Test Device 5: (Colony 1)	0.076	0.077	0.081	0.08
Test Device 5: (Colony 2)	0.076	0.074	0.074	0.072
Test Device 6: (Colony 1)	0.087	0.087	0.091	0.093
Test Device 6: (Colony 2)	0.083	0.082	0.087	0.086

##### 4.1.2 Raw Fluorescence

Sample set:	Replicate 1	Replicate 2	Replicate 3	Replicate 4
Negative Control (Colony 1)	48785	54812	48334	48641
Negative Control (Colony 2)	55348	51843	55043	55328
Positive Control (Colony 1)	53710	52282	56613	49367
Positive Control (Colony 2)	54288	54540	53592	53766
Test Device 1: (Colony 1)	57025	58733	54140	50534
Test Device 1: (Colony 2)	54925	53753	54967	52206
Test Device 2: (Colony 1)	52917	57143	52158	56272
Test Device 2: (Colony 2)	59615	64111	62873	64263
Test Device 3: (Colony 1)	51777	49470	48195	55335
Test Device 3: (Colony 2)	69933	56827	62634	55191
Test Device 4: (Colony 1)	51805	51184	50183	57960
Test Device 4: (Colony 2)	66649	66365	62525	62287
Test Device 5: (Colony 1)	52957	54480	56958	60002
Test Device 5: (Colony 2)	67632	66295	63255	60952
Test Device 6: (Colony 1)	49586	54060	52425	59756

Test Device 6: (Colony 2)	55728	55422	59977	55617
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## 4.2 Hour 2

### 4.2.1 Raw Abs600

Sample set:	Replicate 1	Replicate 2	Replicate 3	Replicate 4
Negative Control (Colony 1)	0.223	0.23	0.234	0.23
Negative Control (Colony 2)	0.254	0.261	0.249	0.265
Positive Control (Colony 1)	0.211	0.199	0.198	0.196
Positive Control (Colony 2)	0.215	0.222	0.265	0.216
Test Device 1: (Colony 1)	0.168	0.198	0.207	0.213
Test Device 1: (Colony 2)	0.184	0.18	0.191	0.187
Test Device 2: (Colony 1)	0.208	0.181	0.192	0.195
Test Device 2: (Colony 2)	0.229	0.24	0.236	0.247
Test Device 3: (Colony 1)	0.245	0.277	0.287	0.296
Test Device 3: (Colony 2)	0.237	0.258	0.247	0.245
Test Device 4: (Colony 1)	0.11	0.12	0.117	0.127
Test Device 4: (Colony 2)	0.114	0.131	0.119	0.122
Test Device 5: (Colony 1)	0.198	0.212	0.213	0.212
Test Device 5: (Colony 2)	0.137	0.138	0.137	0.131
Test Device 6: (Colony 1)	0.246	0.248	0.249	0.252
Test Device 6: (Colony 2)	0.244	0.253	0.238	0.235

### 4.2.2 Raw Fluorescence

Sample set:	Replicate 1	Replicate 2	Replicate 3	Replicate 4
Negative Control (Colony 1)	53563	52621	54704	55531
Negative Control (Colony 2)	61643	63769	61294	61907
Positive Control (Colony 1)	62775	62643	58243	62964
Positive Control (Colony 2)	68685	65147	93256	66783
Test Device 1: (Colony 1)	50009	53330	51697	56404
Test Device 1: (Colony 2)	61633	49335	61742	51717
Test Device 2: (Colony 1)	63807	59567	62956	64145
Test Device 2: (Colony 2)	73136	75932	76432	73309
Test Device 3: (Colony 1)	51242	53373	51978	57234
Test Device 3: (Colony 2)	63587	67474	67395	61912
Test Device 4: (Colony 1)	55851	59088	57803	63424
Test Device 4: (Colony 2)	71925	72608	71186	68169
Test Device 5: (Colony 1)	64496	65372	64333	67933
Test Device 5: (Colony 2)	72089	71011	73027	63945
Test Device 6: (Colony 1)	54191	58824	55002	63059
Test Device 6: (Colony 2)	65520	62975	60900	57105

### 4.3 Hour 4

#### 4.3.1 Raw Abs600

Sample set:	Replicate 1	Replicate 2	Replicate 3	Replicate 4
Negative Control (Colony 1)	0.462	0.489	0.502	0.525
Negative Control (Colony 2)	0.408	0.457	0.456	0.462
Positive Control (Colony 1)	0.388	0.489	0.442	0.459
Positive Control (Colony 2)	0.443	0.446	0.485	0.454
Test Device 1: (Colony 1)	0.46	0.489	0.475	0.551
Test Device 1: (Colony 2)	0.446	0.474	0.476	0.464
Test Device 2: (Colony 1)	0.498	0.508	0.506	0.504
Test Device 2: (Colony 2)	0.417	0.433	0.416	0.42
Test Device 3: (Colony 1)	0.538	0.565	0.555	0.583
Test Device 3: (Colony 2)	0.447	0.475	0.471	0.455
Test Device 4: (Colony 1)	0.223	0.247	0.245	0.259
Test Device 4: (Colony 2)	0.255	0.263	0.265	0.258
Test Device 5: (Colony 1)	0.441	0.49	0.517	0.537
Test Device 5: (Colony 2)	0.317	0.328	0.353	0.337
Test Device 6: (Colony 1)	0.484	0.536	0.558	0.595
Test Device 6: (Colony 2)	0.506	0.528	0.517	0.52

#### 4.3.2 Raw Fluorescence

Sample set:	Replicate 1	Replicate 2	Replicate 3	Replicate 4
Negative Control (Colony 1)	54647	57605	55436	57878
Negative Control (Colony 2)	54155	62751	63069	65295
Positive Control (Colony 1)	72278	85402	72463	73895
Positive Control (Colony 2)	72140	69994	79768	72775
Test Device 1: (Colony 1)	47374	52391	52323	60815
Test Device 1: (Colony 2)	51695	57330	60172	55484
Test Device 2: (Colony 1)	81225	82880	81288	88678
Test Device 2: (Colony 2)	78216	84978	85181	80614
Test Device 3: (Colony 1)	54826	59305	54518	61890
Test Device 3: (Colony 2)	66109	67979	65617	62390
Test Device 4: (Colony 1)	67692	69653	67577	74999
Test Device 4: (Colony 2)	76947	82260	76274	74157
Test Device 5: (Colony 1)	85090	89827	94624	95589
Test Device 5: (Colony 2)	77394	74657	81365	78933
Test Device 6: (Colony 1)	49328	58482	57006	64503
Test Device 6: (Colony 2)	59198	58075	56602	55674

#### 4.4 Hour 6

##### 4.4.1 Raw Abs600

Sample set:	Replicate 1	Replicate 2	Replicate 3	Replicate 4
Negative Control (Colony 1)	0.602	0.625	0.592	0.62
Negative Control (Colony 2)	0.608	0.617	0.61	0.594
Positive Control (Colony 1)	0.534	0.595	0.59	0.608
Positive Control (Colony 2)	0.574	0.59	0.579	0.533
Test Device 1: (Colony 1)	0.741	0.694	0.722	0.738
Test Device 1: (Colony 2)	0.723	0.73	0.742	0.734
Test Device 2: (Colony 1)	0.641	0.604	0.657	0.658
Test Device 2: (Colony 2)	0.644	0.658	0.632	0.633
Test Device 3: (Colony 1)	0.655	0.636	0.663	0.662
Test Device 3: (Colony 2)	0.657	0.647	0.615	0.627
Test Device 4: (Colony 1)	0.418	0.393	0.418	0.432
Test Device 4: (Colony 2)	0.488	0.48	0.47	0.461
Test Device 5: (Colony 1)	0.614	0.628	0.659	0.669
Test Device 5: (Colony 2)	0.572	0.562	0.539	0.513
Test Device 6: (Colony 1)	0.761	0.736	0.771	0.779
Test Device 6: (Colony 2)	0.75	0.759	0.722	0.727

##### 4.4.2 Raw Fluorescence

Sample set:	Replicate 1	Replicate 2	Replicate 3	Replicate 4
Negative Control (Colony 1)	59334	62529	56991	61682
Negative Control (Colony 2)	70904	71623	71048	70331
Positive Control (Colony 1)	77119	95389	89827	96063
Positive Control (Colony 2)	82383	79024	81624	70219
Test Device 1: (Colony 1)	54481	52610	50529	59201
Test Device 1: (Colony 2)	63447	61681	63202	60978
Test Device 2: (Colony 1)	106643	101168	112066	113540
Test Device 2: (Colony 2)	119155	125208	118575	119788
Test Device 3: (Colony 1)	62742	67454	67700	73973
Test Device 3: (Colony 2)	82068	75574	73622	70050
Test Device 4: (Colony 1)	84186	82169	82716	91516
Test Device 4: (Colony 2)	108314	106333	100030	103412
Test Device 5: (Colony 1)	108943	117836	123336	130675
Test Device 5: (Colony 2)	105810	105667	94266	92096
Test Device 6: (Colony 1)	55609	57315	57117	64102
Test Device 6: (Colony 2)	63509	58151	59142	57712



#### 4. Fluorescence Measurement

Experimental Values:	Raw Abs600				Raw Fluorescence			
Sample set:	Replicate 1	Replicate 2	Replicate 3	Replicate 4	Replicate 1	Replicate 2	Replicate 3	Replicate 4
Blank media	0.036	0.038	0.049	0.04	43305	45151	46169	48098
Blank mean:	0.04075				45680.75			

#### 4.1 Hour 0

##### 4.1.1 OD – Background

Sample set:	Replicate 1	Replicate 2	Replicate 3	Replicate 4
Negative Control (Colony 1)	0.02925	0.02725	0.03225	0.02925
Negative Control (Colony 2)	0.03525	0.03825	0.03825	0.03725
Positive Control (Colony 1)	0.02925	0.03225	0.02325	0.03125
Positive Control (Colony 2)	0.03425	0.03425	0.03725	0.03525
Test Device 1: (Colony 1)	0.03325	0.03325	0.03425	0.06525
Test Device 1: (Colony 2)	0.04325	0.03425	0.03525	0.03525
Test Device 2: (Colony 1)	0.03325	0.04025	0.03325	0.03525
Test Device 2: (Colony 2)	0.03825	0.11725	0.03825	0.04025
Test Device 3: (Colony 1)	0.04125	0.04425	0.04525	0.04725
Test Device 3: (Colony 2)	0.04625	0.03925	0.04125	0.03925
Test Device 4: (Colony 1)	0.02525	0.02525	0.02625	0.02625
Test Device 4: (Colony 2)	0.02825	0.02725	0.02425	0.02825
Test Device 5: (Colony 1)	0.03525	0.03625	0.04025	0.03925
Test Device 5: (Colony 2)	0.03525	0.03325	0.03325	0.03125
Test Device 6: (Colony 1)	0.04625	0.04625	0.05025	0.05225
Test Device 6: (Colony 2)	0.04225	0.04125	0.04625	0.04525

##### 4.1.2 Fluorescence – Background

Sample set:	Replicate 1	Replicate 2	Replicate 3	Replicate 4
Negative Control (Colony 1)	3104.25	9131.25	2653.25	2960.25
Negative Control (Colony 2)	9667.25	6162.25	9362.25	9647.25
Positive Control (Colony 1)	8029.25	6601.25	10932.25	3686.25
Positive Control (Colony 2)	8607.25	8859.25	7911.25	8085.25
Test Device 1: (Colony 1)	11344.25	13052.25	8459.25	4853.25
Test Device 1: (Colony 2)	9244.25	8072.25	9286.25	6525.25
Test Device 2: (Colony 1)	7236.25	11462.25	6477.25	10591.25
Test Device 2: (Colony 2)	13934.25	18430.25	17192.25	18582.25
Test Device 3: (Colony 1)	6096.25	3789.25	2514.25	9654.25
Test Device 3: (Colony 2)	24252.25	11146.25	16953.25	9510.25

Test Device 4: (Colony 1)	6124.25	5503.25	4502.25	12279.25
Test Device 4: (Colony 2)	20968.25	20684.25	16844.25	16606.25
Test Device 5: (Colony 1)	7276.25	8799.25	11277.25	14321.25
Test Device 5: (Colony 2)	21951.25	20614.25	17574.25	15271.25
Test Device 6: (Colony 1)	3905.25	8379.25	6744.25	14075.25
Test Device 6: (Colony 2)	10047.25	9741.25	14296.25	9936.25

#### 4.1.3 uM Fluorescein / OD600

Sample set:	Replicate 1	Replicate 2	Replicate 3	Replicate 4
Negative Control (Colony 1)	3.83	12.10	2.97	3.65
Negative Control (Colony 2)	9.90	5.82	8.84	9.35
Positive Control (Colony 1)	9.91	7.39	16.98	4.26
Positive Control (Colony 2)	9.07	9.34	7.67	8.28
Test Device 1: (Colony 1)	12.32	14.18	8.92	2.69
Test Device 1: (Colony 2)	7.72	8.51	9.51	6.68
Test Device 2: (Colony 1)	7.86	10.28	7.03	10.85
Test Device 2: (Colony 2)	13.16	5.68	16.23	16.67
Test Device 3: (Colony 1)	5.34	3.09	2.01	7.38
Test Device 3: (Colony 2)	18.94	10.25	14.84	8.75
Test Device 4: (Colony 1)	8.76	7.87	6.19	16.89
Test Device 4: (Colony 2)	26.80	27.41	25.08	21.23
Test Device 5: (Colony 1)	7.45	8.77	10.12	13.18
Test Device 5: (Colony 2)	22.49	22.39	19.09	17.65
Test Device 6: (Colony 1)	3.05	6.54	4.85	9.73
Test Device 6: (Colony 2)	8.59	8.53	11.16	7.93

#### 4.1.4 Summary Statistics

Sample set:	Arith. Mean	Arith. Std.Dev.	Geo. Mean	Geo. Std. Dev.
Negative Control (Colony 1)	5.64	4.32	4.74	1.887
Negative Control (Colony 2)	8.48	1.83	8.31	1.274
Positive Control (Colony 1)	9.64	5.41	8.53	1.781
Positive Control (Colony 2)	8.59	0.76	8.57	1.094
Test Device 1: (Colony 1)	9.53	5.05	8.04	2.131
Test Device 1: (Colony 2)	8.11	1.20	8.04	1.162
Test Device 2: (Colony 1)	9.01	1.85	8.86	1.232
Test Device 2: (Colony 2)	12.93	5.08	11.92	1.659
Test Device 3: (Colony 1)	4.45	2.39	3.95	1.781
Test Device 3: (Colony 2)	13.20	4.62	12.60	1.419
Test Device 4: (Colony 1)	9.93	4.76	9.22	1.536
Test Device 4: (Colony 2)	25.13	2.78	25.01	1.123
Test Device 5: (Colony 1)	9.88	2.45	9.66	1.273
Test Device 5: (Colony 2)	20.40	2.42	20.29	1.128
Test Device 6: (Colony 1)	6.04	2.84	5.54	1.632

Test Device 6: (Colony 2)	9.05	1.44	8.97	1.162
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## 4.2 Hour 2

### 4.2.1 OD - Background

Sample set:	Replicate 1	Replicate 2	Replicate 3	Replicate 4
Negative Control (Colony 1)	0.18225	0.18925	0.19325	0.18925
Negative Control (Colony 2)	0.21325	0.22025	0.20825	0.22425
Positive Control (Colony 1)	0.17025	0.15825	0.15725	0.15525
Positive Control (Colony 2)	0.17425	0.18125	0.22425	0.17525
Test Device 1: (Colony 1)	0.12725	0.15725	0.16625	0.17225
Test Device 1: (Colony 2)	0.14325	0.13925	0.15025	0.14625
Test Device 2: (Colony 1)	0.16725	0.14025	0.15125	0.15425
Test Device 2: (Colony 2)	0.18825	0.19925	0.19525	0.20625
Test Device 3: (Colony 1)	0.20425	0.23625	0.24625	0.25525
Test Device 3: (Colony 2)	0.19625	0.21725	0.20625	0.20425
Test Device 4: (Colony 1)	0.06925	0.07925	0.07625	0.08625
Test Device 4: (Colony 2)	0.07325	0.09025	0.07825	0.08125
Test Device 5: (Colony 1)	0.15725	0.17125	0.17225	0.17125
Test Device 5: (Colony 2)	0.09625	0.09725	0.09625	0.09025
Test Device 6: (Colony 1)	0.20525	0.20725	0.20825	0.21125
Test Device 6: (Colony 2)	0.20325	0.21225	0.19725	0.19425

### 4.2.2 Fluorescence – Background

Sample set:	Replicate 1	Replicate 2	Replicate 3	Replicate 4
Negative Control (Colony 1)	7882.25	6940.25	9023.25	9850.25
Negative Control (Colony 2)	15962.25	18088.25	15613.25	16226.25
Positive Control (Colony 1)	17094.25	16962.25	12562.25	17283.25
Positive Control (Colony 2)	23004.25	19466.25	47575.25	21102.25
Test Device 1: (Colony 1)	4328.25	7649.25	6016.25	10723.25
Test Device 1: (Colony 2)	15952.25	3654.25	16061.25	6036.25
Test Device 2: (Colony 1)	18126.25	13886.25	17275.25	18464.25
Test Device 2: (Colony 2)	27455.25	30251.25	30751.25	27628.25
Test Device 3: (Colony 1)	5561.25	7692.25	6297.25	11553.25
Test Device 3: (Colony 2)	17906.25	21793.25	21714.25	16231.25
Test Device 4: (Colony 1)	10170.25	13407.25	12122.25	17743.25
Test Device 4: (Colony 2)	26244.25	26927.25	25505.25	22488.25
Test Device 5: (Colony 1)	18815.25	19691.25	18652.25	22252.25
Test Device 5: (Colony 2)	26408.25	25330.25	27346.25	18264.25
Test Device 6: (Colony 1)	8510.25	13143.25	9321.25	17378.25
Test Device 6: (Colony 2)	19839.25	17294.25	15219.25	11424.25

#### 4.2.3 uM Fluorescein / OD600

Sample set:	Replicate 1	Replicate 2	Replicate 3	Replicate 4
Negative Control (Colony 1)	1.56	1.32	1.69	1.88
Negative Control (Colony 2)	2.70	2.97	2.71	2.61
Positive Control (Colony 1)	3.63	3.87	2.88	4.02
Positive Control (Colony 2)	4.77	3.88	7.66	4.35
Test Device 1: (Colony 1)	1.23	1.76	1.31	2.25
Test Device 1: (Colony 2)	4.02	0.95	3.86	1.49
Test Device 2: (Colony 1)	3.91	3.58	4.12	4.32
Test Device 2: (Colony 2)	5.27	5.48	5.69	4.84
Test Device 3: (Colony 1)	0.98	1.18	0.92	1.63
Test Device 3: (Colony 2)	3.29	3.62	3.80	2.87
Test Device 4: (Colony 1)	5.30	6.11	5.74	7.43
Test Device 4: (Colony 2)	12.94	10.77	11.77	9.99
Test Device 5: (Colony 1)	4.32	4.15	3.91	4.69
Test Device 5: (Colony 2)	9.91	9.41	10.26	7.31
Test Device 6: (Colony 1)	1.50	2.29	1.62	2.97
Test Device 6: (Colony 2)	3.52	2.94	2.79	2.12

#### 4.2.4 Summary Statistics

Sample set:	Arith. Mean	Arith. Std.Dev.	Geo. Mean	Geo. Std. Dev.
Negative Control (Colony 1)	1.61	0.23	1.60	1.159
Negative Control (Colony 2)	2.75	0.15	2.74	1.056
Positive Control (Colony 1)	3.60	0.50	3.57	1.160
Positive Control (Colony 2)	5.16	1.70	4.98	1.349
Test Device 1: (Colony 1)	1.63	0.47	1.59	1.323
Test Device 1: (Colony 2)	2.58	1.59	2.16	2.047
Test Device 2: (Colony 1)	3.98	0.32	3.97	1.085
Test Device 2: (Colony 2)	5.32	0.36	5.31	1.072
Test Device 3: (Colony 1)	1.18	0.32	1.15	1.292
Test Device 3: (Colony 2)	3.40	0.41	3.38	1.132
Test Device 4: (Colony 1)	6.15	0.92	6.10	1.155
Test Device 4: (Colony 2)	11.37	1.27	11.32	1.118
Test Device 5: (Colony 1)	4.27	0.33	4.26	1.079
Test Device 5: (Colony 2)	9.22	1.32	9.14	1.166
Test Device 6: (Colony 1)	2.09	0.68	2.01	1.375
Test Device 6: (Colony 2)	2.84	0.58	2.80	1.233

### 4.3 Hour 4

#### 4.3.1 OD – Background

Sample set:	Replicate 1	Replicate 2	Replicate 3	Replicate 4
Negative Control (Colony 1)	0.42125	0.44825	0.46125	0.48425
Negative Control (Colony 2)	0.36725	0.41625	0.41525	0.42125
Positive Control (Colony 1)	0.34725	0.44825	0.40125	0.41825
Positive Control (Colony 2)	0.40225	0.40525	0.44425	0.41325
Test Device 1: (Colony 1)	0.41925	0.44825	0.43425	0.51025
Test Device 1: (Colony 2)	0.40525	0.43325	0.43525	0.42325
Test Device 2: (Colony 1)	0.45725	0.46725	0.46525	0.46325
Test Device 2: (Colony 2)	0.37625	0.39225	0.37525	0.37925
Test Device 3: (Colony 1)	0.49725	0.52425	0.51425	0.54225
Test Device 3: (Colony 2)	0.40625	0.43425	0.43025	0.41425
Test Device 4: (Colony 1)	0.18225	0.20625	0.20425	0.21825
Test Device 4: (Colony 2)	0.21425	0.22225	0.22425	0.21725
Test Device 5: (Colony 1)	0.40025	0.44925	0.47625	0.49625
Test Device 5: (Colony 2)	0.27625	0.28725	0.31225	0.29625
Test Device 6: (Colony 1)	0.44325	0.49525	0.51725	0.55425
Test Device 6: (Colony 2)	0.46525	0.48725	0.47625	0.47925

#### 4.3.2 Fluorescence – Background

Sample set:	Replicate 1	Replicate 2	Replicate 3	Replicate 4
Negative Control (Colony 1)	8966.25	11924.25	9755.25	12197.25
Negative Control (Colony 2)	8474.25	17070.25	17388.25	19614.25
Positive Control (Colony 1)	26597.25	39721.25	26782.25	28214.25
Positive Control (Colony 2)	26459.25	24313.25	34087.25	27094.25
Test Device 1: (Colony 1)	1693.25	6710.25	6642.25	15134.25
Test Device 1: (Colony 2)	6014.25	11649.25	14491.25	9803.25
Test Device 2: (Colony 1)	35544.25	37199.25	35607.25	42997.25
Test Device 2: (Colony 2)	32535.25	39297.25	39500.25	34933.25
Test Device 3: (Colony 1)	9145.25	13624.25	8837.25	16209.25
Test Device 3: (Colony 2)	20428.25	22298.25	19936.25	16709.25
Test Device 4: (Colony 1)	22011.25	23972.25	21896.25	29318.25
Test Device 4: (Colony 2)	31266.25	36579.25	30593.25	28476.25
Test Device 5: (Colony 1)	39409.25	44146.25	48943.25	49908.25
Test Device 5: (Colony 2)	31713.25	28976.25	35684.25	33252.25
Test Device 6: (Colony 1)	3647.25	12801.25	11325.25	18822.25
Test Device 6: (Colony 2)	13517.25	12394.25	10921.25	9993.25

### 4.3.3 $\mu\text{M}$ Fluorescein / OD600

Sample set:	Replicate 1	Replicate 2	Replicate 3	Replicate 4
Negative Control (Colony 1)	0.77	0.96	0.76	0.91
Negative Control (Colony 2)	0.83	1.48	1.51	1.68
Positive Control (Colony 1)	2.77	3.20	2.41	2.44
Positive Control (Colony 2)	2.38	2.17	2.77	2.37
Test Device 1: (Colony 1)	0.15	0.54	0.55	1.07
Test Device 1: (Colony 2)	0.54	0.97	1.20	0.84
Test Device 2: (Colony 1)	2.81	2.87	2.76	3.35
Test Device 2: (Colony 2)	3.12	3.62	3.80	3.33
Test Device 3: (Colony 1)	0.66	0.94	0.62	1.08
Test Device 3: (Colony 2)	1.82	1.85	1.67	1.46
Test Device 4: (Colony 1)	4.36	4.20	3.87	4.85
Test Device 4: (Colony 2)	5.27	5.94	4.93	4.73
Test Device 5: (Colony 1)	3.56	3.55	3.71	3.63
Test Device 5: (Colony 2)	4.15	3.64	4.13	4.05
Test Device 6: (Colony 1)	0.30	0.93	0.79	1.23
Test Device 6: (Colony 2)	1.05	0.92	0.83	0.75

### 4.3.4 Summary Statistics

Sample set:	Arith. Mean	Arith. Std.Dev.	Geo. Mean	Geo. Std. Dev.
Negative Control (Colony 1)	0.85	0.10	0.85	1.124
Negative Control (Colony 2)	1.38	0.37	1.33	1.373
Positive Control (Colony 1)	2.70	0.37	2.68	1.142
Positive Control (Colony 2)	2.42	0.25	2.41	1.108
Test Device 1: (Colony 1)	0.58	0.38	0.46	2.305
Test Device 1: (Colony 2)	0.89	0.28	0.85	1.408
Test Device 2: (Colony 1)	2.95	0.27	2.94	1.093
Test Device 2: (Colony 2)	3.47	0.30	3.46	1.091
Test Device 3: (Colony 1)	0.83	0.22	0.80	1.306
Test Device 3: (Colony 2)	1.70	0.18	1.69	1.116
Test Device 4: (Colony 1)	4.32	0.41	4.31	1.098
Test Device 4: (Colony 2)	5.22	0.53	5.20	1.105
Test Device 5: (Colony 1)	3.61	0.08	3.61	1.021
Test Device 5: (Colony 2)	3.99	0.24	3.99	1.063
Test Device 6: (Colony 1)	0.81	0.39	0.72	1.854
Test Device 6: (Colony 2)	0.89	0.13	0.88	1.153

#### 4.4 Hour 6

##### 4.4.1 OD – Background

Sample set:	Replicate 1	Replicate 2	Replicate 3	Replicate 4
Negative Control (Colony 1)	0.56125	0.58425	0.55125	0.57925
Negative Control (Colony 2)	0.56725	0.57625	0.56925	0.55325
Positive Control (Colony 1)	0.49325	0.55425	0.54925	0.56725
Positive Control (Colony 2)	0.53325	0.54925	0.53825	0.49225
Test Device 1: (Colony 1)	0.70025	0.65325	0.68125	0.69725
Test Device 1: (Colony 2)	0.68225	0.68925	0.70125	0.69325
Test Device 2: (Colony 1)	0.60025	0.56325	0.61625	0.61725
Test Device 2: (Colony 2)	0.60325	0.61725	0.59125	0.59225
Test Device 3: (Colony 1)	0.61425	0.59525	0.62225	0.62125
Test Device 3: (Colony 2)	0.61625	0.60625	0.57425	0.58625
Test Device 4: (Colony 1)	0.37725	0.35225	0.37725	0.39125
Test Device 4: (Colony 2)	0.44725	0.43925	0.42925	0.42025
Test Device 5: (Colony 1)	0.57325	0.58725	0.61825	0.62825
Test Device 5: (Colony 2)	0.53125	0.52125	0.49825	0.47225
Test Device 6: (Colony 1)	0.72025	0.69525	0.73025	0.73825
Test Device 6: (Colony 2)	0.70925	0.71825	0.68125	0.68625

##### 4.4.2 Fluorescence – Background

Sample set:	Replicate 1	Replicate 2	Replicate 3	Replicate 4
Negative Control (Colony 1)	13653.25	16848.25	11310.25	16001.25
Negative Control (Colony 2)	25223.25	25942.25	25367.25	24650.25
Positive Control (Colony 1)	31438.25	49708.25	44146.25	50382.25
Positive Control (Colony 2)	36702.25	33343.25	35943.25	24538.25
Test Device 1: (Colony 1)	8800.25	6929.25	4848.25	13520.25
Test Device 1: (Colony 2)	17766.25	16000.25	17521.25	15297.25
Test Device 2: (Colony 1)	60962.25	55487.25	66385.25	67859.25
Test Device 2: (Colony 2)	73474.25	79527.25	72894.25	74107.25
Test Device 3: (Colony 1)	17061.25	21773.25	22019.25	28292.25
Test Device 3: (Colony 2)	36387.25	29893.25	27941.25	24369.25
Test Device 4: (Colony 1)	38505.25	36488.25	37035.25	45835.25
Test Device 4: (Colony 2)	62633.25	60652.25	54349.25	57731.25
Test Device 5: (Colony 1)	63262.25	72155.25	77655.25	84994.25
Test Device 5: (Colony 2)	60129.25	59986.25	48585.25	46415.25
Test Device 6: (Colony 1)	9928.25	11634.25	11436.25	18421.25
Test Device 6: (Colony 2)	17828.25	12470.25	13461.25	12031.25

#### 4.4.3 uM Fluorescein / OD600

Sample set:	Replicate 1	Replicate 2	Replicate 3	Replicate 4
Negative Control (Colony 1)	0.88	1.04	0.74	1.00
Negative Control (Colony 2)	1.61	1.63	1.61	1.61
Positive Control (Colony 1)	2.30	3.24	2.90	3.21
Positive Control (Colony 2)	2.49	2.19	2.41	1.80
Test Device 1: (Colony 1)	0.45	0.38	0.26	0.70
Test Device 1: (Colony 2)	0.94	0.84	0.90	0.80
Test Device 2: (Colony 1)	3.67	3.56	3.89	3.97
Test Device 2: (Colony 2)	4.40	4.65	4.45	4.52
Test Device 3: (Colony 1)	1.00	1.32	1.28	1.64
Test Device 3: (Colony 2)	2.13	1.78	1.76	1.50
Test Device 4: (Colony 1)	3.69	3.74	3.55	4.23
Test Device 4: (Colony 2)	5.06	4.99	4.57	4.96
Test Device 5: (Colony 1)	3.99	4.44	4.54	4.89
Test Device 5: (Colony 2)	4.09	4.16	3.52	3.55
Test Device 6: (Colony 1)	0.50	0.60	0.57	0.90
Test Device 6: (Colony 2)	0.91	0.63	0.71	0.63

#### 4.4.4 Summary Statistics

Sample set:	Arith. Mean	Arith. Std.Dev.	Geo. Mean	Geo. Std. Dev.
Negative Control (Colony 1)	0.91	0.13	0.91	1.165
Negative Control (Colony 2)	1.61	0.01	1.61	1.006
Positive Control (Colony 1)	2.91	0.43	2.89	1.172
Positive Control (Colony 2)	2.22	0.31	2.21	1.157
Test Device 1: (Colony 1)	0.45	0.19	0.42	1.515
Test Device 1: (Colony 2)	0.87	0.06	0.87	1.077
Test Device 2: (Colony 1)	3.77	0.19	3.77	1.052
Test Device 2: (Colony 2)	4.51	0.11	4.50	1.025
Test Device 3: (Colony 1)	1.31	0.26	1.29	1.224
Test Device 3: (Colony 2)	1.79	0.26	1.78	1.154
Test Device 4: (Colony 1)	3.80	0.30	3.79	1.079
Test Device 4: (Colony 2)	4.89	0.22	4.89	1.047
Test Device 5: (Colony 1)	4.46	0.37	4.45	1.088
Test Device 5: (Colony 2)	3.83	0.34	3.82	1.093
Test Device 6: (Colony 1)	0.64	0.18	0.63	1.292
Test Device 6: (Colony 2)	0.72	0.13	0.71	1.188