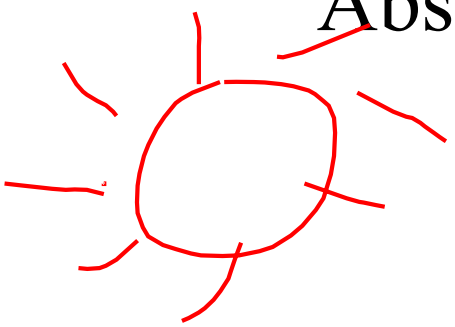
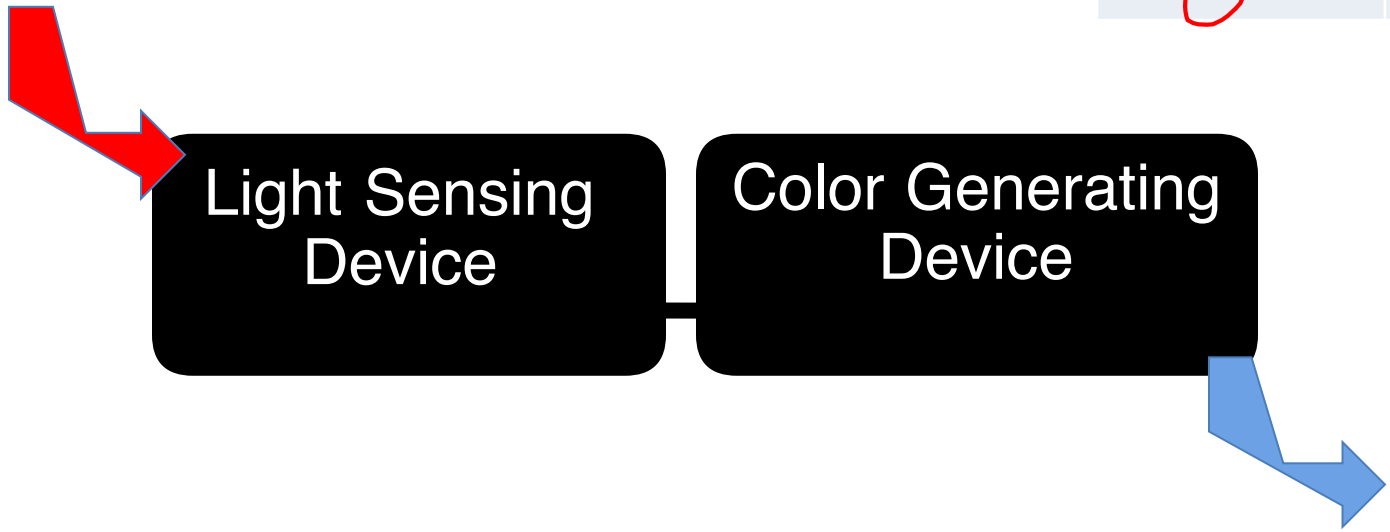
System Engineering
M2D1

10.13.11

Abstracted View of Bacterial Photography



Input	Output
1	0
0	1



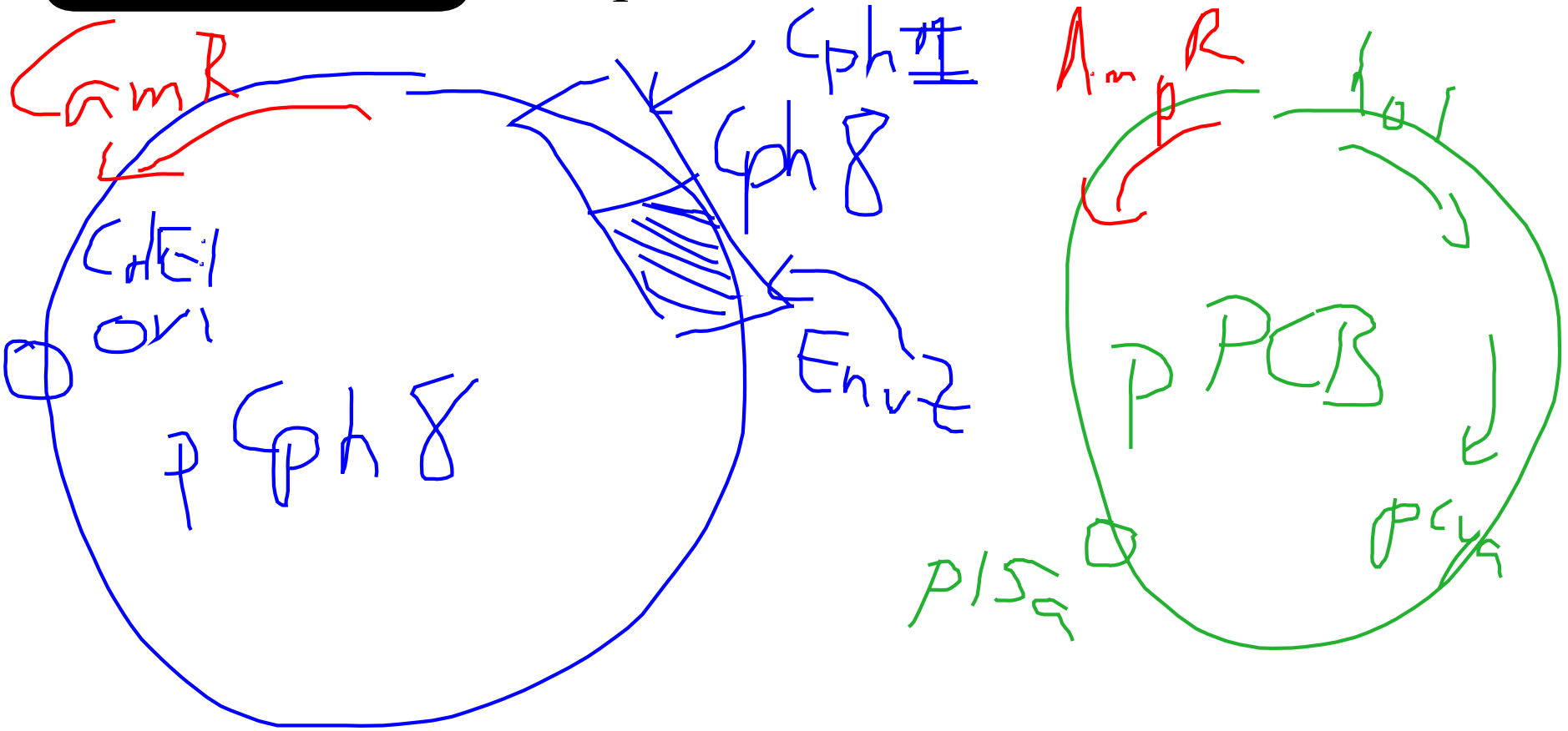
Design Goal: improve dynamic range

Practically speaking: lighter in the light

Light Sensing Device

Inside the light sensing device

2 plasmids needed



Cyanobacterial light sensor = Cph1
EnvZ cytoplasmic responder

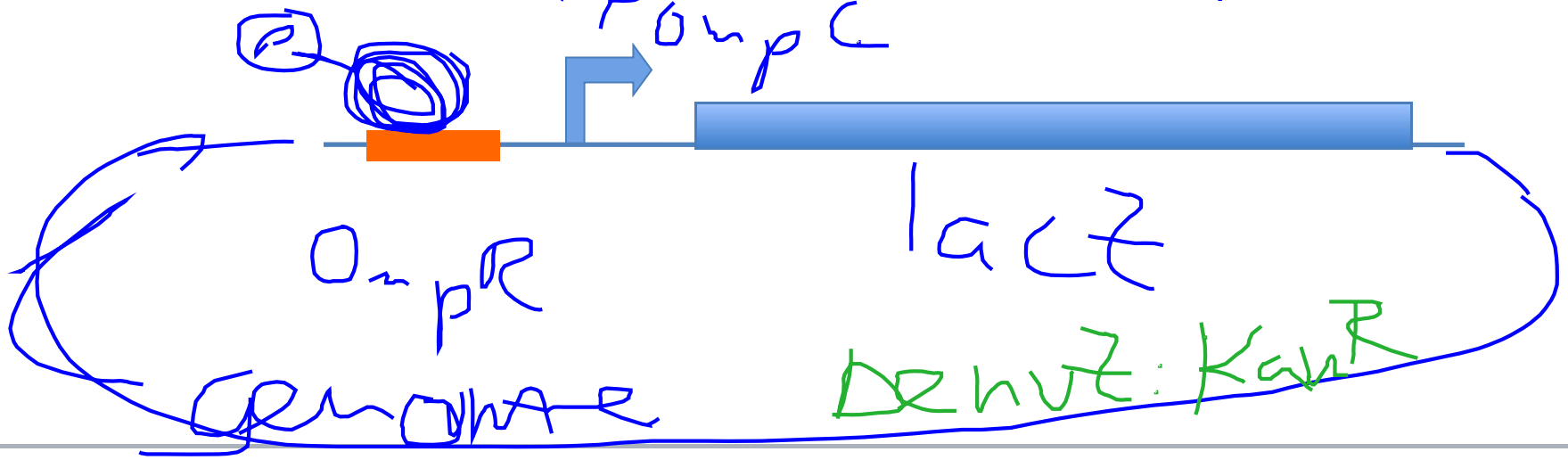
Synechocystis
haem into phycocyanobilin

Inside the color generating device

Color Generating Device

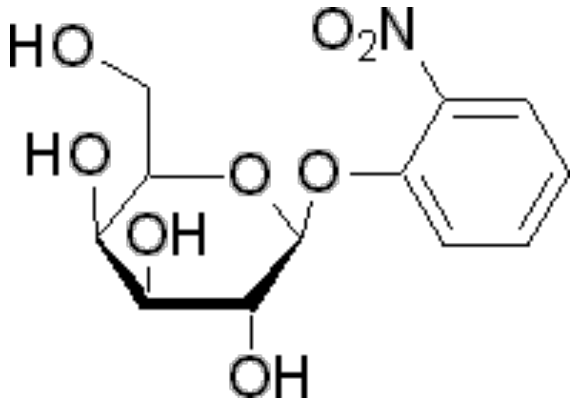
Modification of Two Component Signaling System

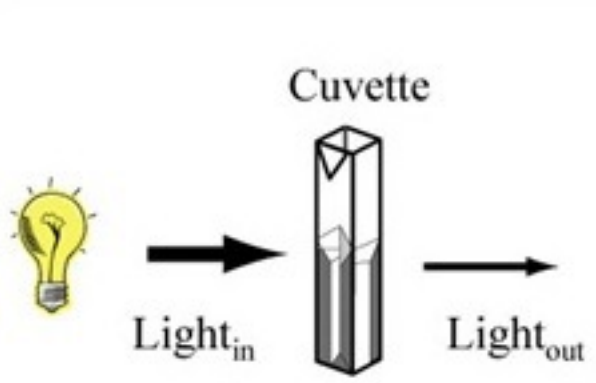
	NATURAL (Osmolarity)	**MODIFIED** (light)
Sensor	EnvZ	Cph8
Responder	OmpR	OmpR



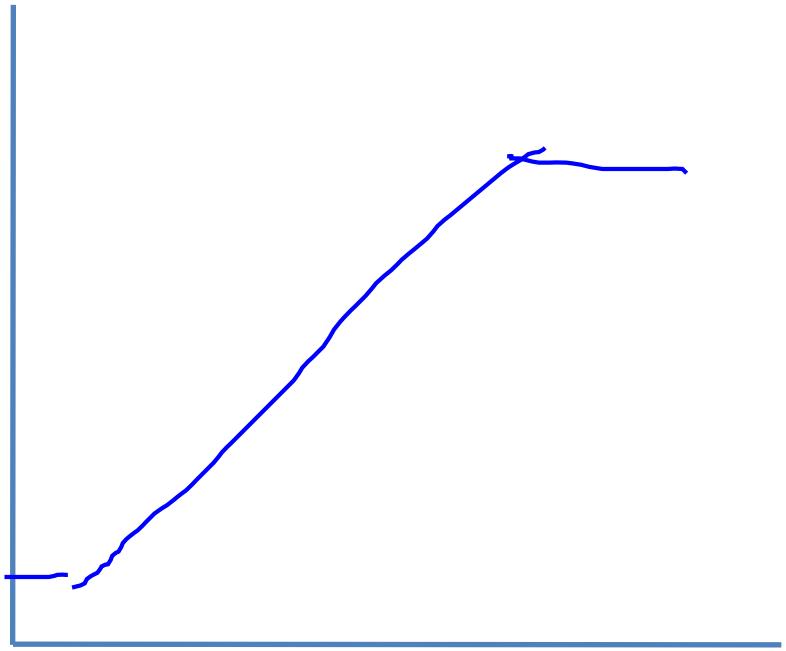
b-gal activity produces color: in liquid

ONPG





Must be in the linear range



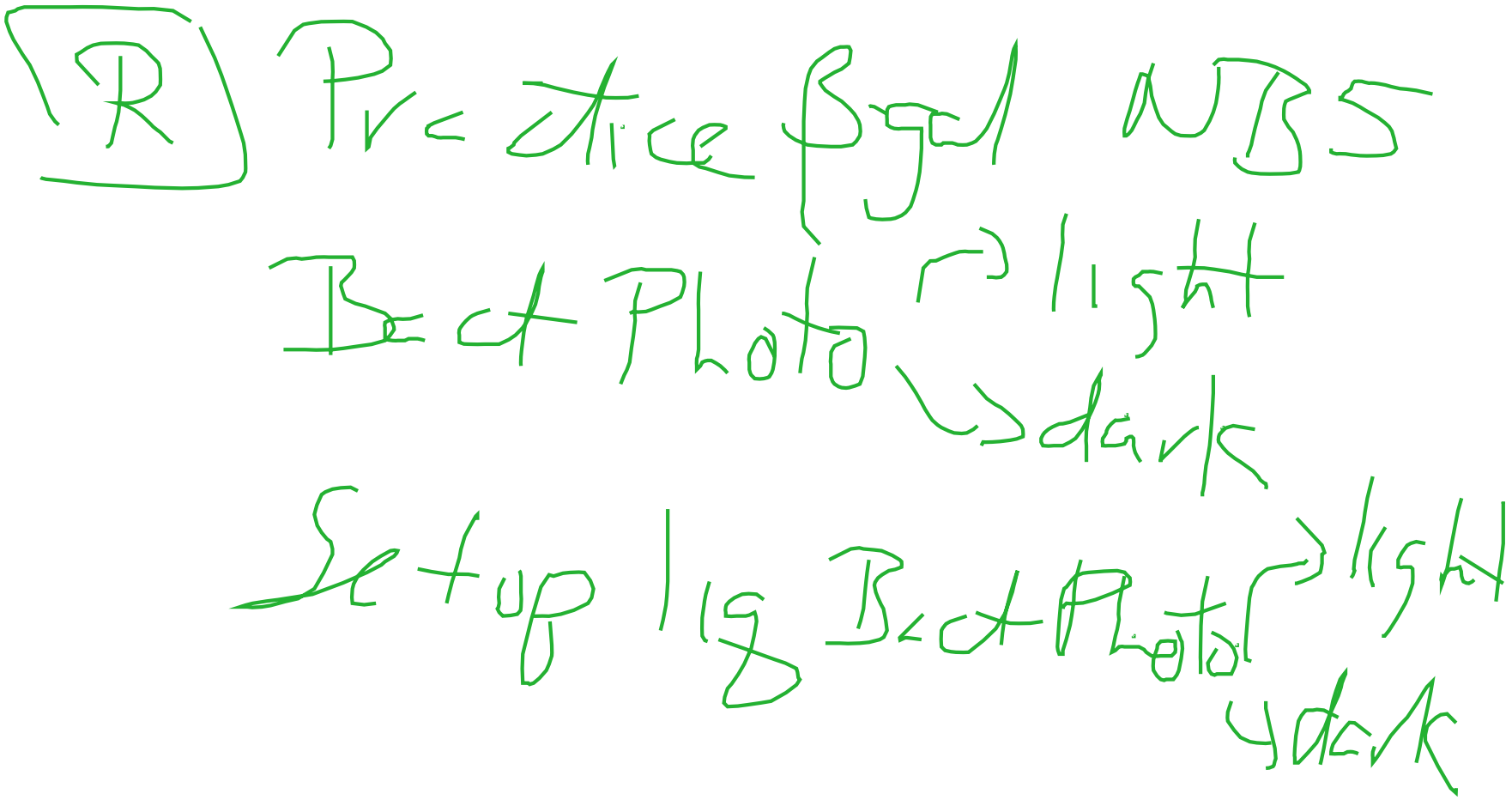
Measuring b-gal activity

Protocol

1. Measure concentration of cells
2. Lyse cells
3. Start Reactions
4. Stop Reactions
5. Spin
6. Measure yellow color and debris

$$\text{1 Miller Unit} = 1000 * \frac{(Abs420 - (1.75 * Abs550))}{(t * v * Abs600)}$$

Today in lab


R
Practice Bgd NBS
Bact Photo
light
dark
Setup 1g Bact Photo
light
dark