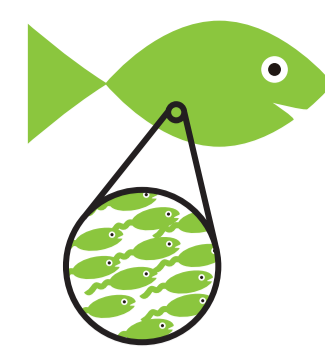
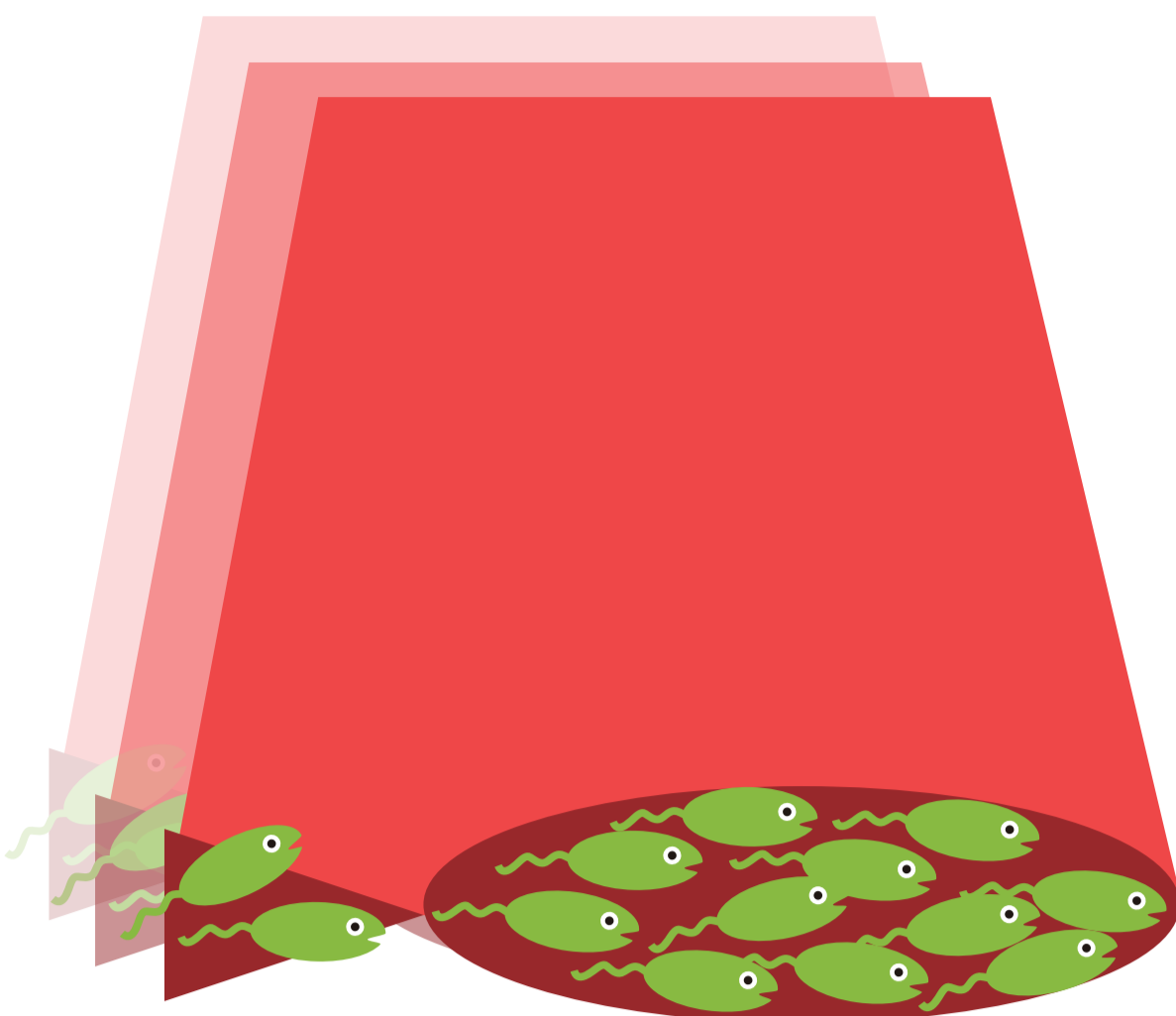


Swimmy Bacteria

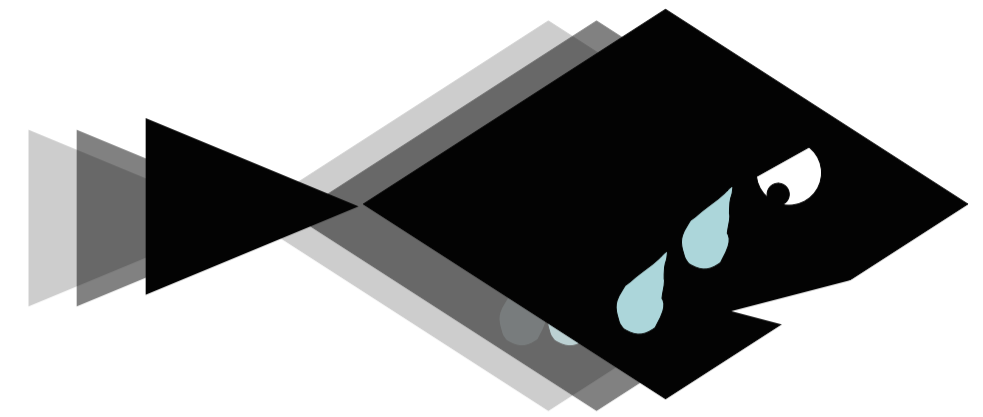


Maiko.F, Toru.K,
Yohei.T, Tomoki.M

Goal ~ a bacterial movie



1. Trap the E.coli with Light.
2. Make a light mask and draw a bacterial picture by their shade.
3. Move the mask and make a movie!



Design

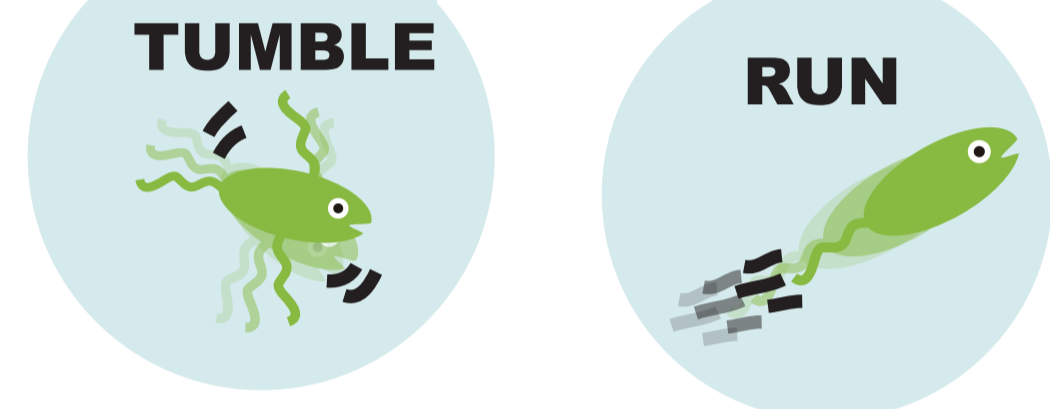
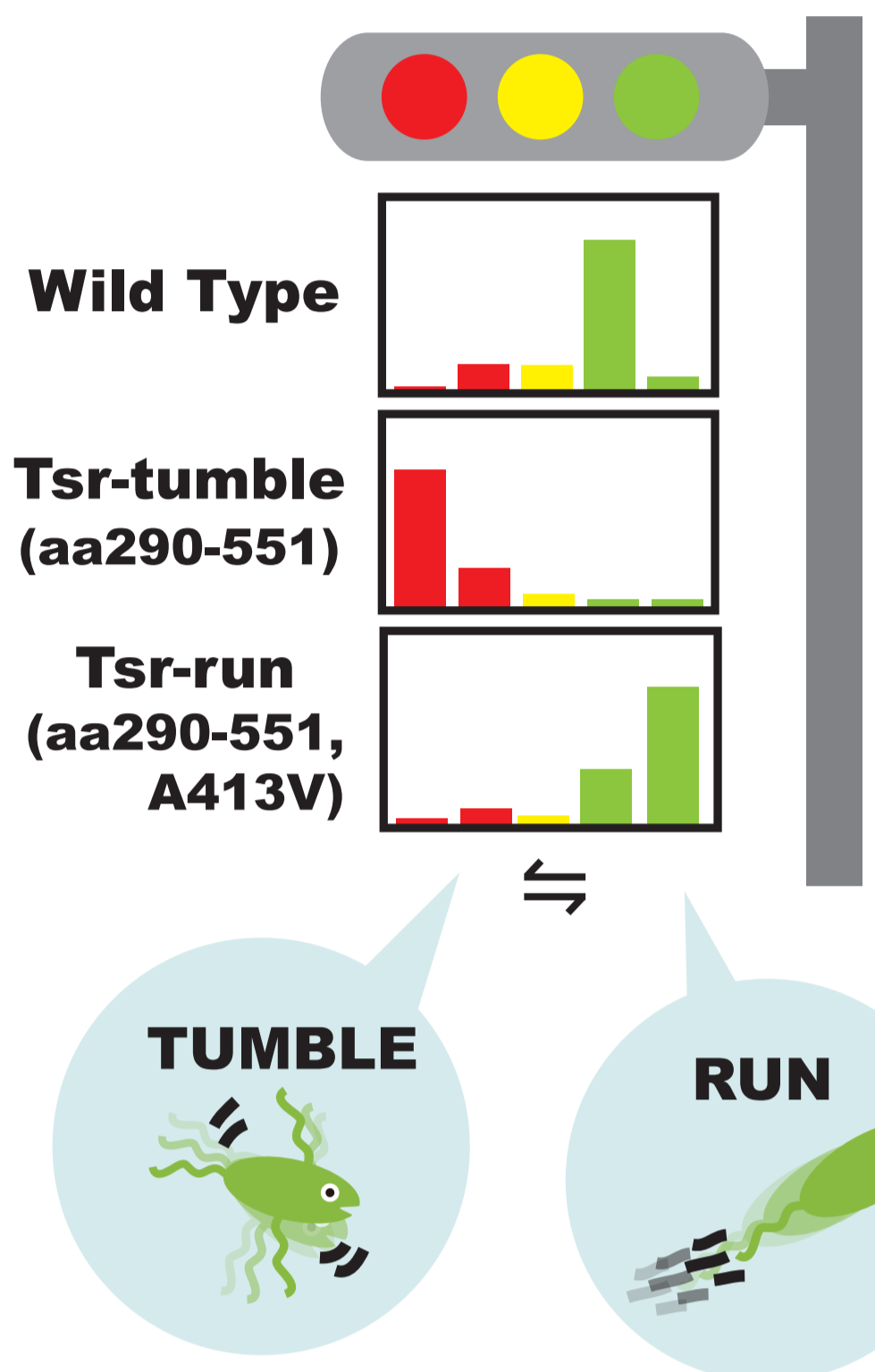
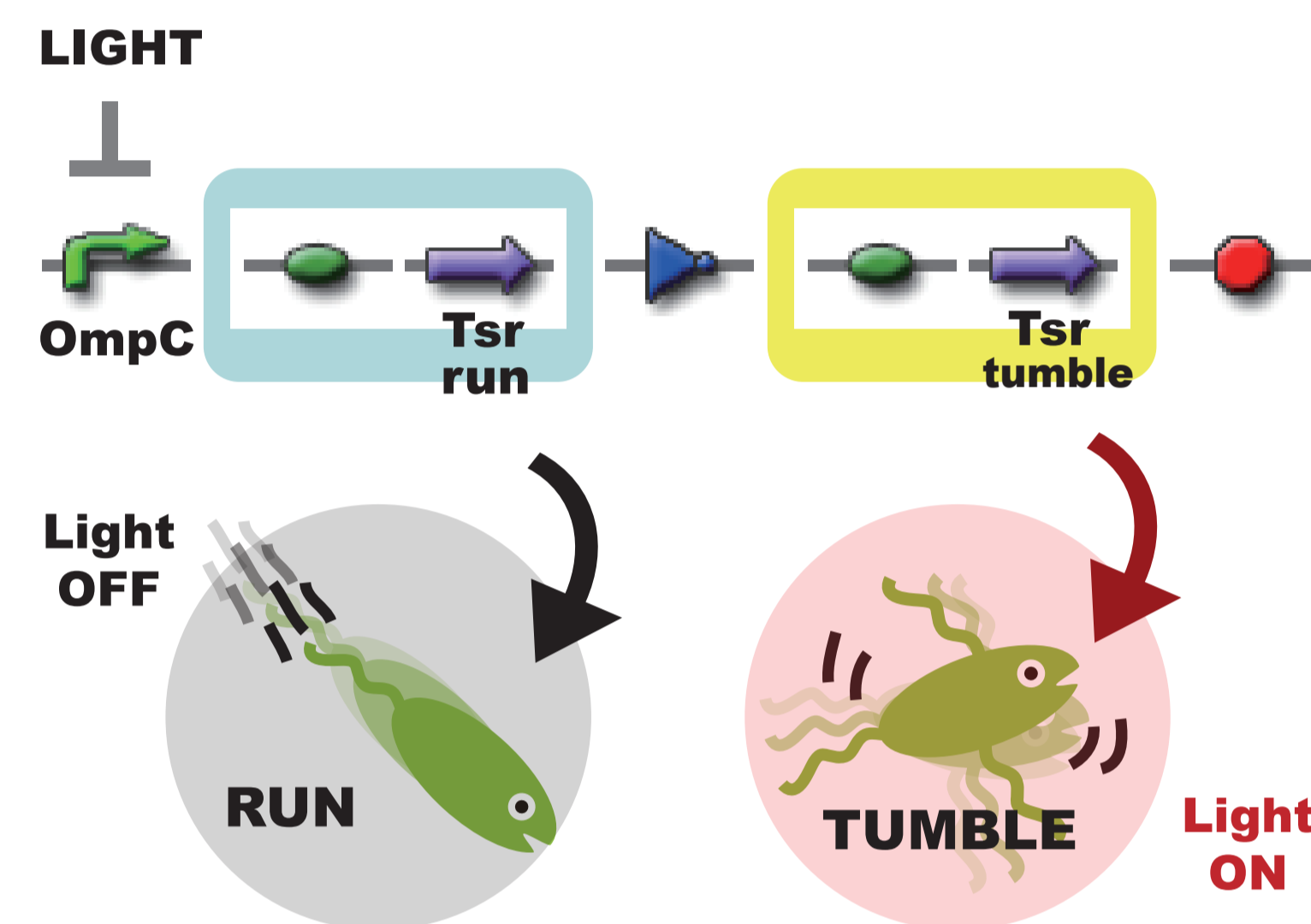
BACKGROUND

Tsr is a chemoreceptor protein for serine attractant. Truncated Tsr and its mutant alter the swimming behavior of *E. coli* upon over expression.

(Ames & Parkinson, *J.Bacteriol.*, 176:6340-6348, 1994)

PARTS DESIGN

To regulate the swimming behavior of the *E. coli*, we put the Tsr mutants under the control of light sensing device (Levskaia et.al, *Nature*, 441, 2005)

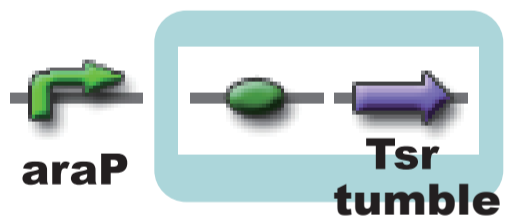


Experiments & Results

Microscope Assay

TEST CONSTRUCT

cell: Tsr- strain
plasmid: pSB1A2
gene: araP- tsr-tumble



METHOD

Microscope movement of *E. coli* harboring araP- tsr-tumble was observed both in "Tumble" (Ara ~0.3%) & "Run" (Ara 0%) media for 10 sec. each.

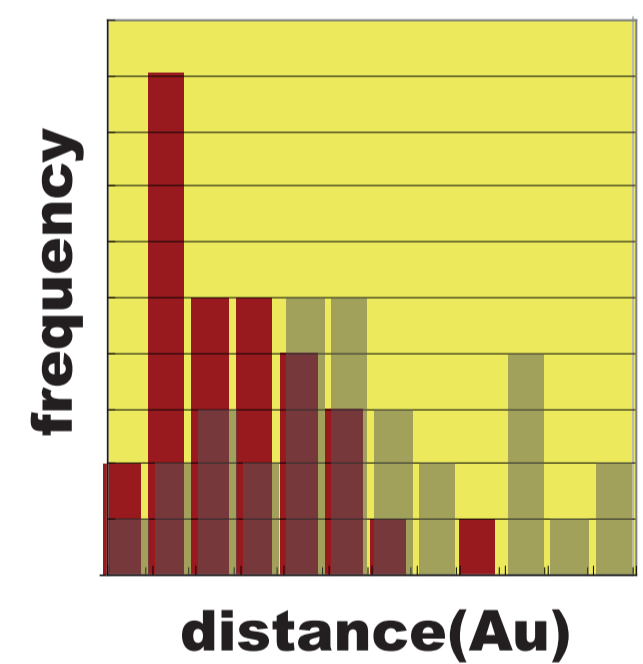


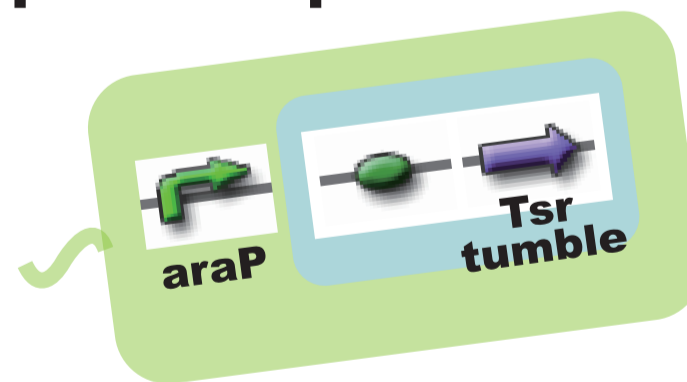
FIG: Migration speed of individual cells sampled from "Run" & "Tumble" media.

Tsr expression significantly slowed down *E. coli*.

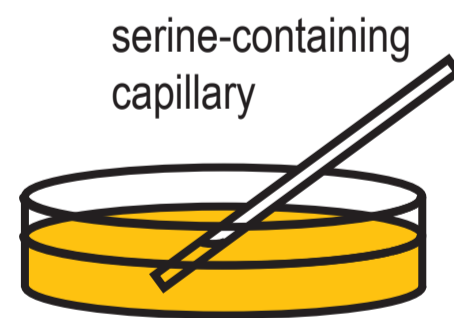
Capillary Assay

TEST CONSTRUCT

cell: Tsr- strain
plasmid: pSB1A2



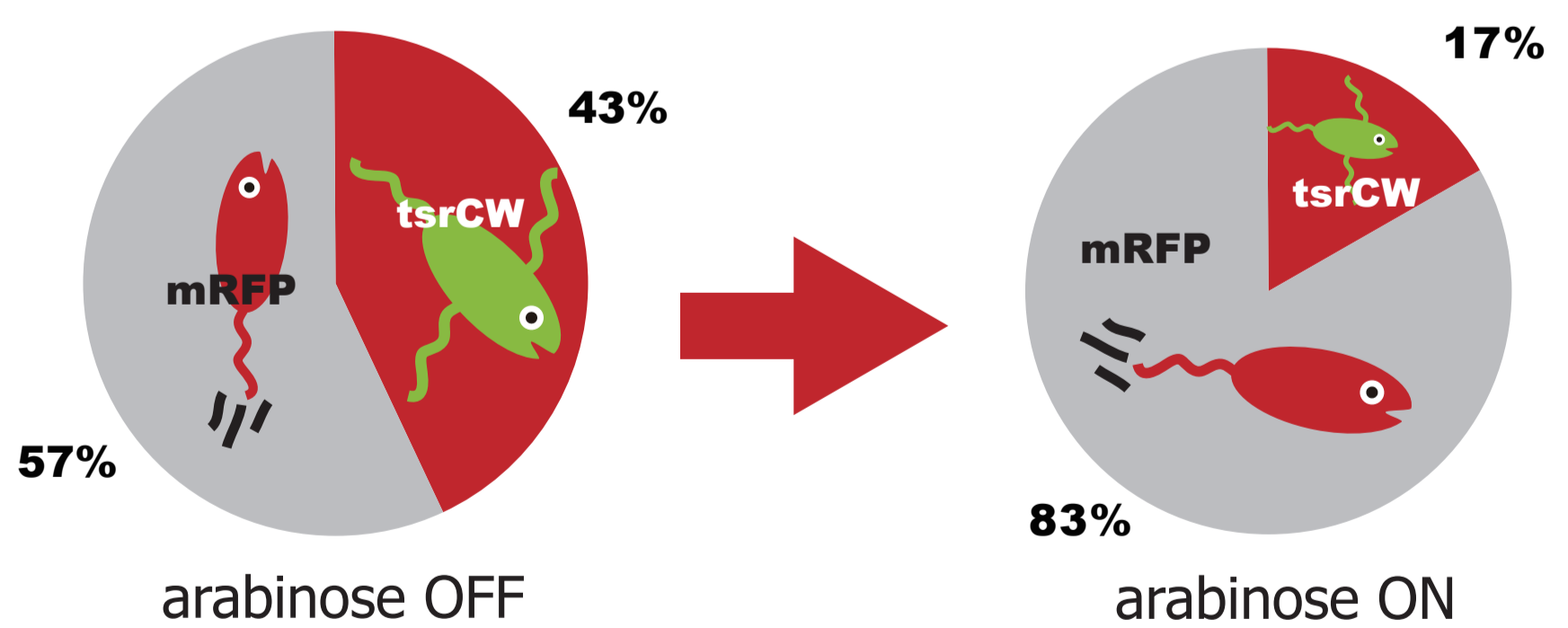
METHOD



Serine-capillary was inserted to the mixture of *E. coli* having araP- tsr-tumble or tetP-mRFP. After an hour the number of *E. coli* immigrated into the capillary was counted.

(Adler, *J.Gen.MicroBiol.*, 74:77-91, 1973)

RESULTS



Tsr expression seems to slow down the *E. coli* ... a bit.

Conclusion

WE LEARNED

- Tsr-tumble really change the swimming behavior of *E. coli*.
- We are already in the world of synthetic biology(chaos).

YET TO BE DONE

- To Achieve "Goal 1". Harness the Tsr-tumble with the light sensor.
- Observe the effect of the Tsr-tumble more clearly.
- Analyse the Tsr-run parts.

...and draw a picture.

...then make a Movie!

Swarm Plates (... didnt work well)

