

Exploring the expression of chromoproteins in *Dictyostelium discoideum*

Ivor Ho

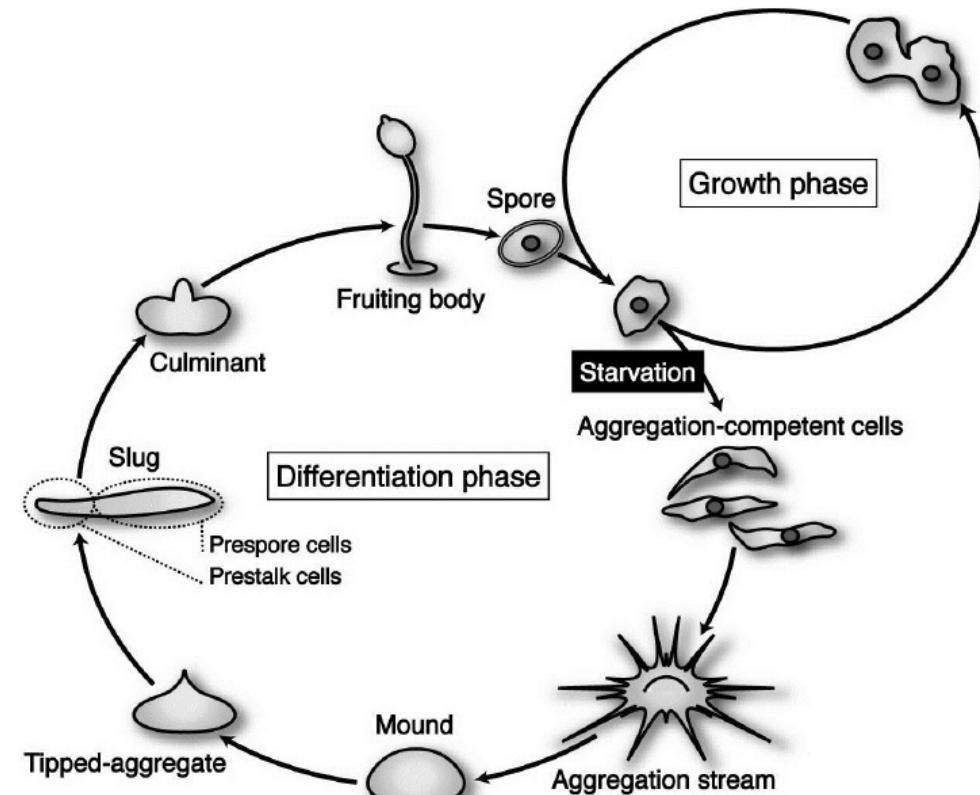
PI: Gad Shaulsky, PhD

Bench Mentor: Mariko Kurasawa, PhD



Introduction

- Morphogenesis
- Availability of a comprehensive annotated database
- Easy to grow



Maeda, Yasuo & Chida, Junji. (2014). 3. 943-966.
10.3390/biom3040943.



Chromoprotein

- Homologous to fluorescent proteins
- Absorbs visible light to give strong colors
- Can be used as genetic markers



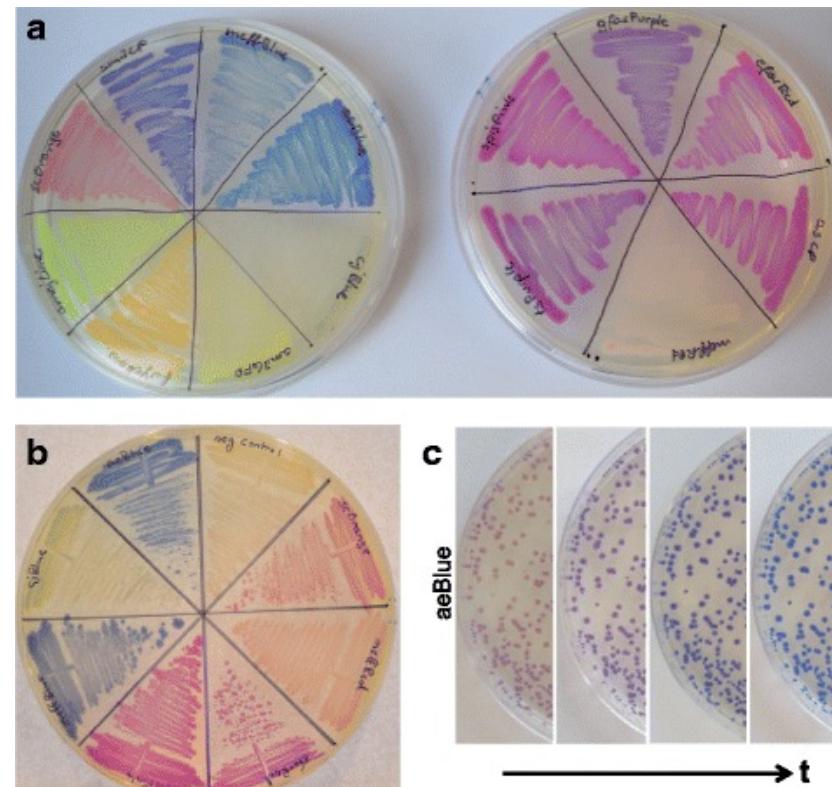
<https://www.southampton.ac.uk/news/2013/01/purple-and-pink-sunscreens.page>

“How the purple and pink sunscreens of reef corals work”

Color variation in chromoproteins

- Different colored bacterial colonies

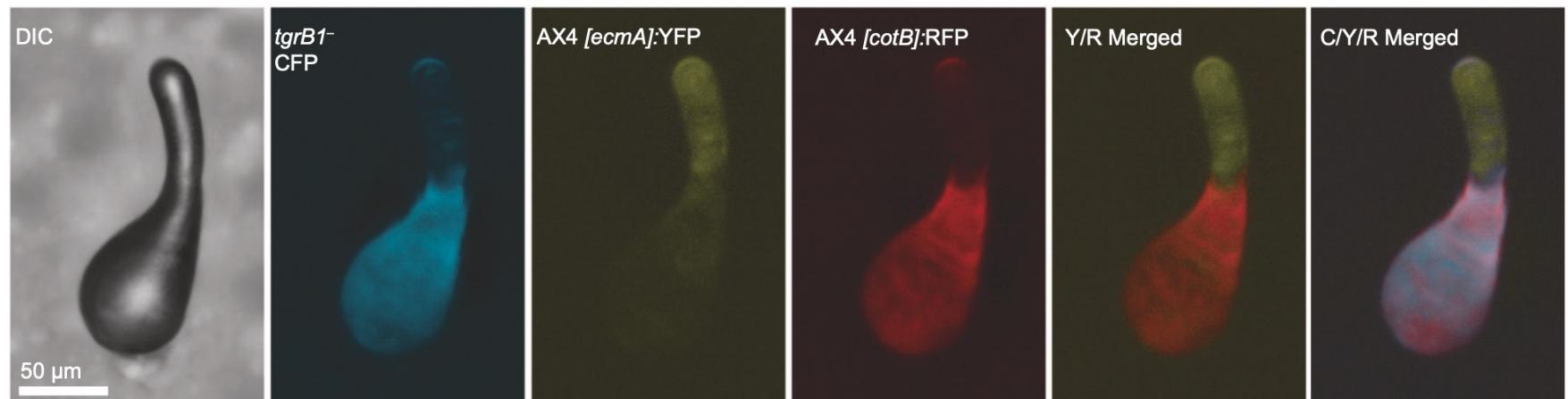
Pellet	Other names	Host eukaryote	Chromo-phore*	Excitation max. (nm)	Emission max. (nm)
S	meffRFP	<i>Montipora efflorescens</i>	fDYG	560	576
	eforCP	<i>Echinopora forskaliana</i>	HMYG	589	609
	asCP, asFP595	<i>Anemonia sulcata</i>	cMYG	568	595
	spisCP	<i>Stylophora pistillata</i>	LKYG	560	NF
	ScroogeOrange	Synthetic	cMYG		
	FezziwigYFP	Synthetic	LTYG	520	540
	amilGPF	<i>Acropora millepora</i>	FQYG	503	512
	amajCFP, amFP486	<i>Anemonia majano</i>	FKYG	458	486
S	cjBlue	<i>Cnidopus japonicus</i>	cQYG	610	NF
S	Rtms5, NF pocilloporin	<i>Montipora efflorescens</i>	cQYG	592	NF
	aeCP597	<i>Actinia equina</i>	cMYG	597	NF
	amilCP	<i>Acropora millepora</i>	cQYG	588	NF
	TinselPurple	Synthetic	cMYG		
	glasCP	<i>Galaxea fascicularis</i>	sQYG	577	NF



Liljeruhm J. et.al. J Biol Eng. 2018;12:8.

Fluorescent proteins in *Dictyostelium discoideum*

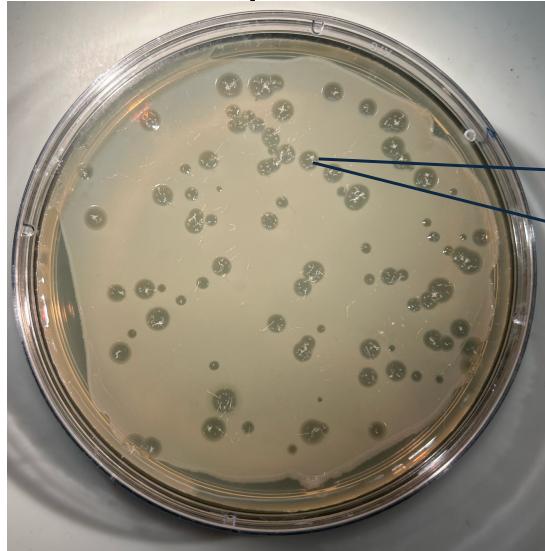
- Observe cell differentiation and behavior with fluorescent proteins



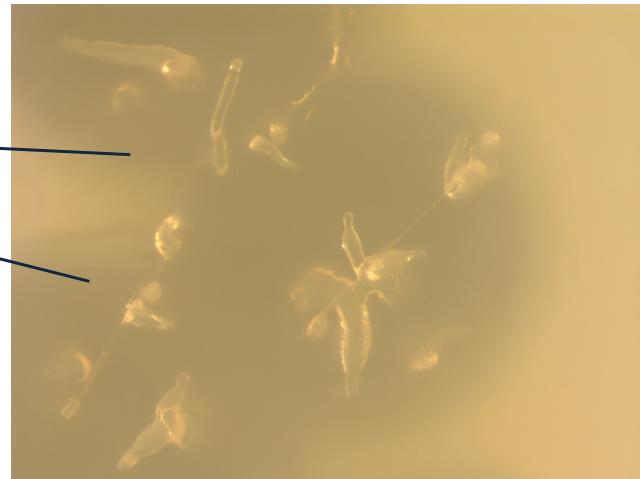
Katoh-Kurasawa M, Lehmann P, Shaulsky G. Nat Commun. 2024;15(1):3984.

Transformation of *Dictyostelium* cells

- Electroporation for the DNA to enter the cells

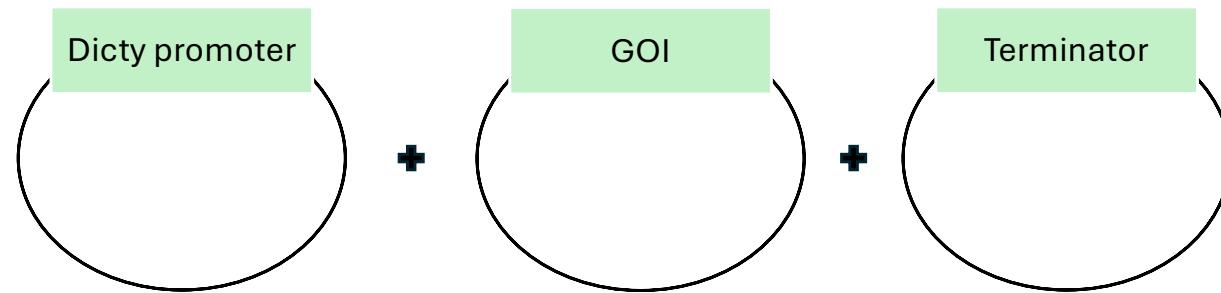


Dictyostelium cells with DreidelTeal expression vector on SM plate



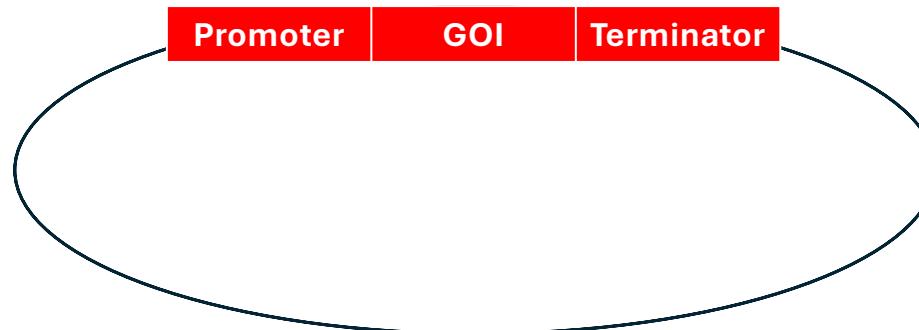
Developing transformed *Dictyostelium* cells with DreidelTeal expression vector

GoldenBraid cloning system

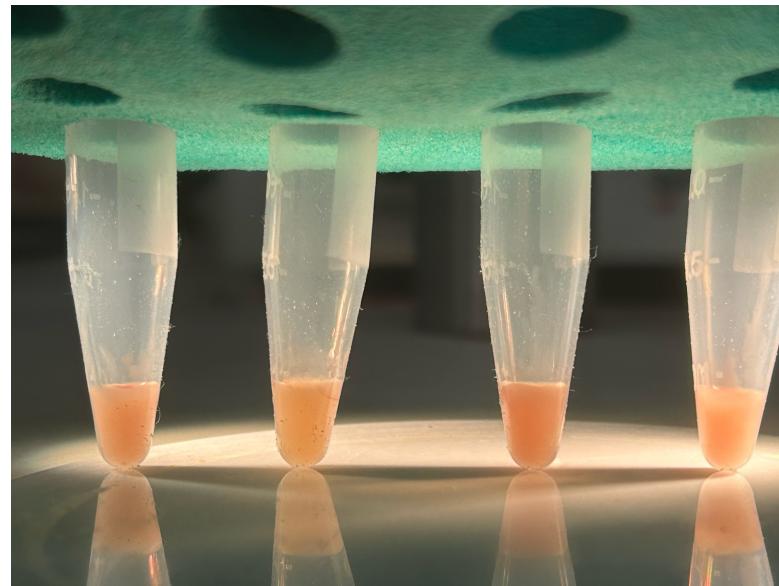


Chromoproteins:

TinselPurple
DreidelTeal
ScroogeOrange

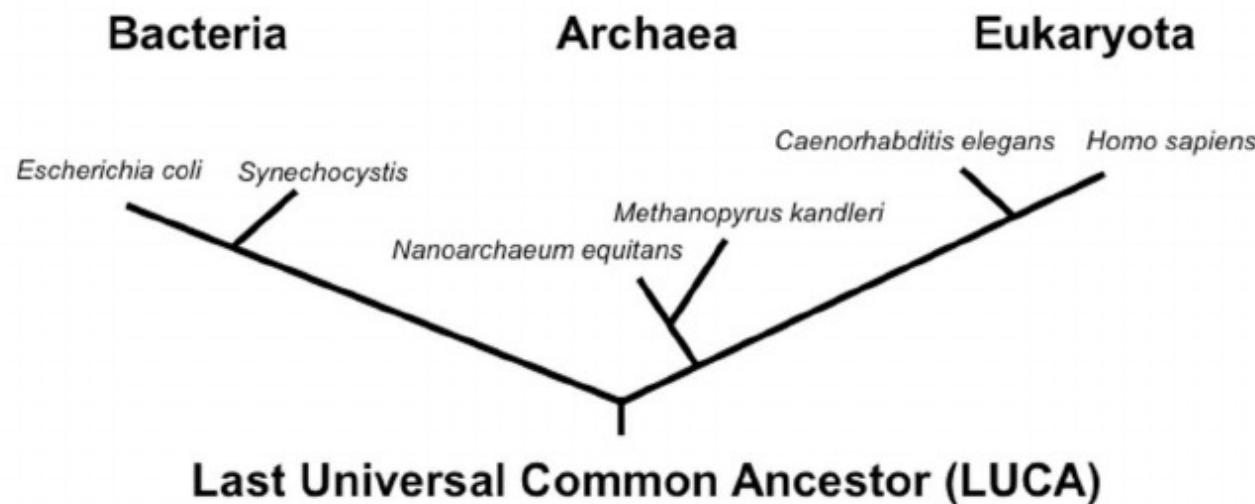


Centrifugation



Future

- Expand knowledge of chromoproteins and its functions
- Chromoprotein expression in other domains of life



Fujishima, Kosuke et. Al. (2008). 173. 206-218.

10.1143/PTPS.173.206.

Acknowledgements

I would like to thank the Shaulsky lab and the SMART program for devoting time and resources for my growth as a scientist and researcher.

Pellet	BioBrick ¹⁶	Name	Other names	Host eukaryote	Chromo-phore*	Excitation max. (nm)	Emission max. (nm)	Source ref.
 S	K1033922	meffRed	meffRFP	<i>Montipora efflorescens</i>	FDYG	560	576	2
	K592012	eforRed	eforCP	<i>Echinopora forskaliana</i>	HMYG	589	609	2
	K1033927	asPink	asCP, asFP595	<i>Anemonia sulcata</i>	cMYG	568	595	19
	K1033925	spisPink	spisCP	<i>Stylophora pistillata</i>	LKYG	560	NF	2
	K1033913	scOrange	ScroogeOrange	Synthetic	cMYG			15
	K1033910	fwYellow	FezziwigYFP	Synthetic	LTYG	520	540	15
	K592010	amilGFP		<i>Acropora millepora</i>	FQYG	503	512	2
	K1033916	amajLime	amajCFP, amFP486	<i>Anemonia majano</i>	FKYG	458	486	18
 S	K592011	cjBlue		<i>Cnidopus japonicus</i>	cQYG	610	NF	20
 S	K1033902	meffBlue	Rlms5, NF pocilloporin	<i>Montipora efflorescens</i>	cQYG	592	NF	21
	K864401	aeBlue	aeCP597	<i>Actinia equina</i>	cMYG	597	NF	22
	K592009	amilCP		<i>Acropora millepora</i>	cQYG	588	NF	2
	K1033906	tsPurple	TinselPurple	Synthetic	cMYG			15
	K1033927	glasPurple	glasCP	<i>Galaxea fascicularis</i>	sQYG	577	NF	2