e-Delay
Fruit Ripening Delayer

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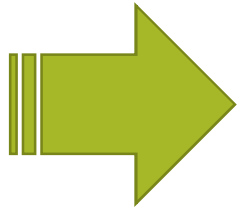
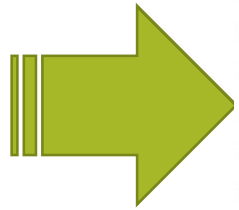
Latar Belakang

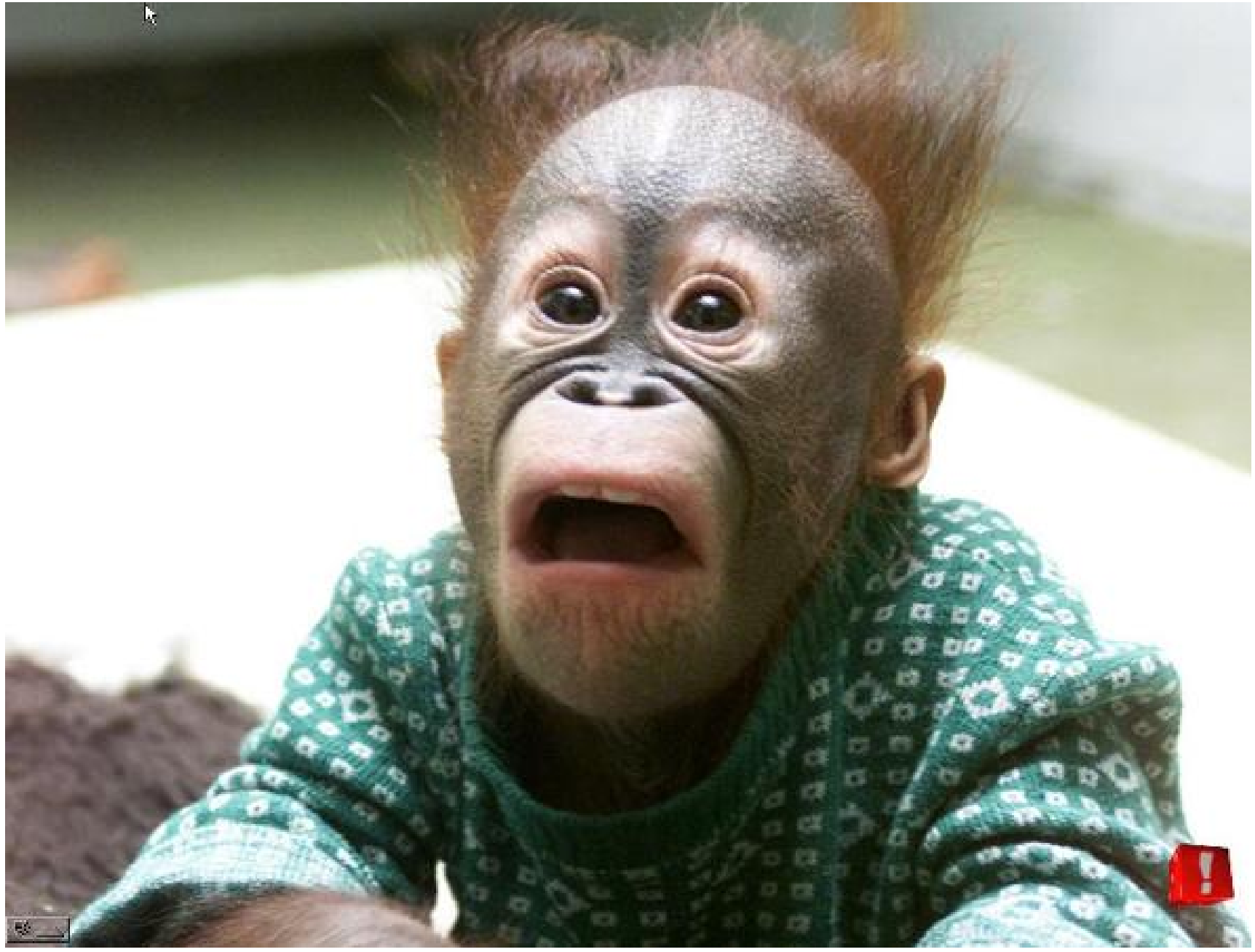
Buah klimakterik adalah buah yang terus mengalami pematangan setelah melalui pemanenan.
Laju respirasi **tinggi**, biosintesis etilen **tinggi**.
Mengalami proses **autokatalitik etilen**.

Giovannoni, 2001

Latar Belakang







Latar Belakang

Teknologi

Teknologi

Teknologi Penyimpanan Buah

Controlled Atmosphere Packaging (CAP) dan Modified Atmosphere Packaging (MAP).

Suhu, kandungan gas (O_2, CO_2, N_2) yang dimodifikasi atau dikontrol.

- Mereduksi laju respirasi
- Menginhibisi biosintesis dan aksi etilen
- Penghambatan pematangan
- Kualitas buah terjaga
- Telah diaplikasikan dalam skala industri

- Relatif mahal
- Relatif sulit

Tujuan

Mendesain teknologi alternatif untuk menunda pematangan buah klimaterik dengan mengaplikasikan biologi sintetik.

e-Delay

Etilen

Fungsi:

Perkecambahan biji; perkembangan rambut akar; nodulasi akar; perkembangan bunga; absisi; dan **pematangan buah**

Biosintesis: jalur metionin

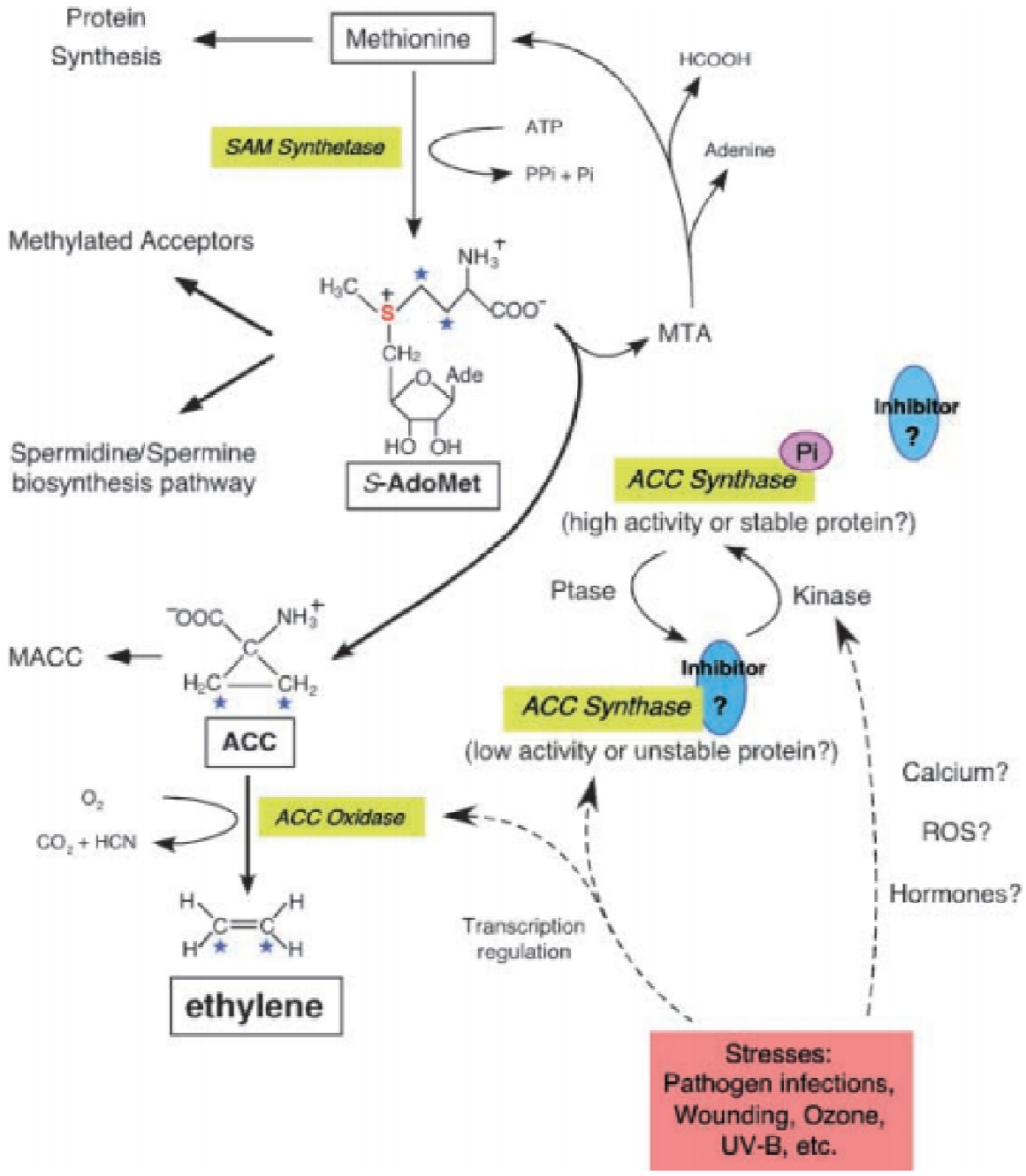
Regulasi biosintesis:

- Internal signal

- Respon lingkungan: biotik (e.g. patogen) dan abiotik (e.g. perlukaan, cekaman suhu)

(Wang et al., 2002)

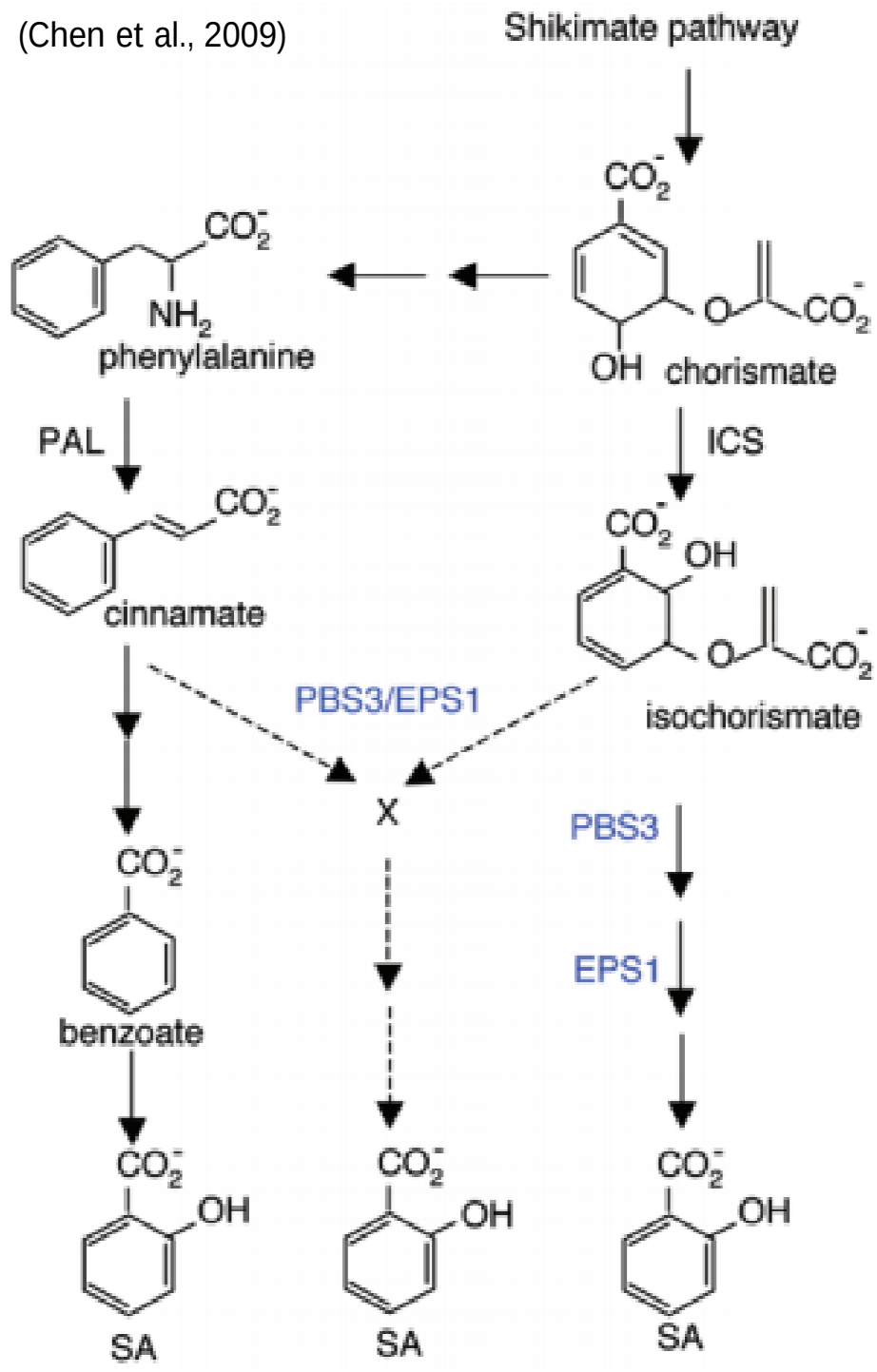
SA dapat menghambat biosintesis etilen
(Leslie & Romani, 1988)



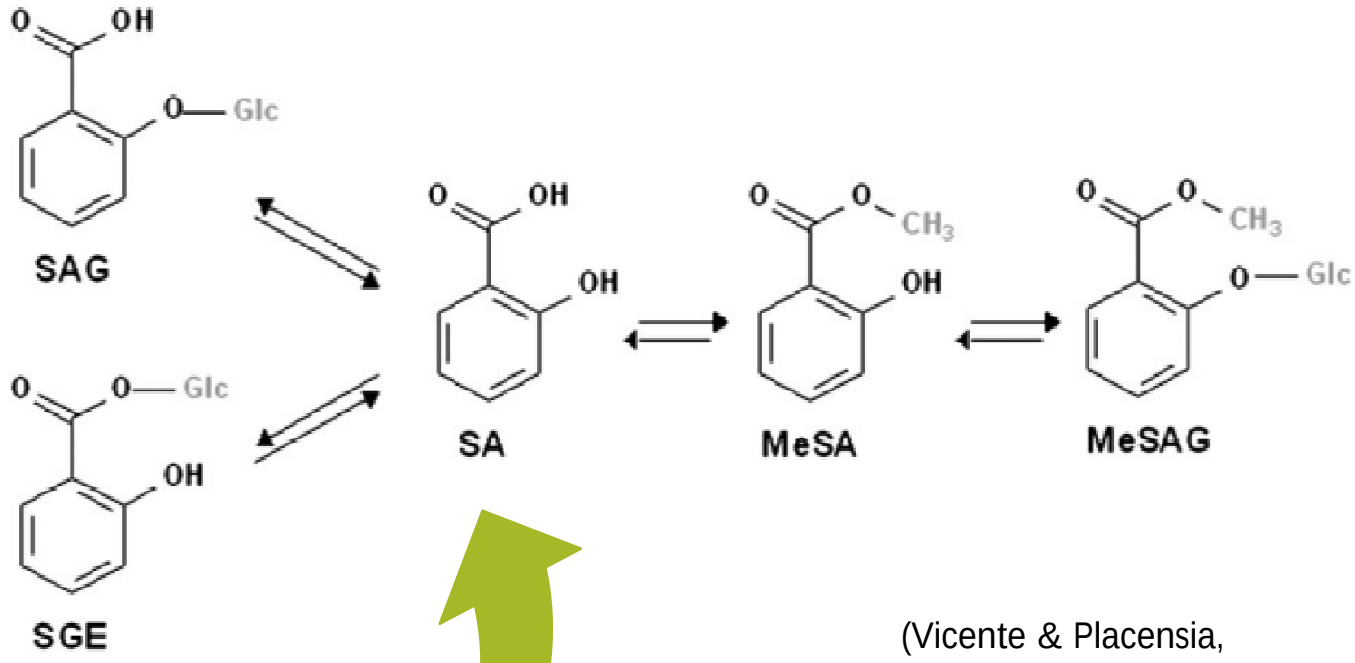
Asam Salisilat

- Senyawa fenolik yang disintesis oleh tumbuhan dan beberapa jenis bakteri (e.g *P.aeruginosa*)
- Peran: pertahanan; Perkecambahan biji; Fotosintesis; respirasi; Pertumbuhan; Perbungaan; Penuaan (Vicente & Placensia, 2011)
- Biosintesis: jalur Phenylpropanoid (sitoplasma) dan **jalur isochorismate (kloroplas, bakteri)** (Vicente & Placensia, 2011)

(Chen et al., 2009)

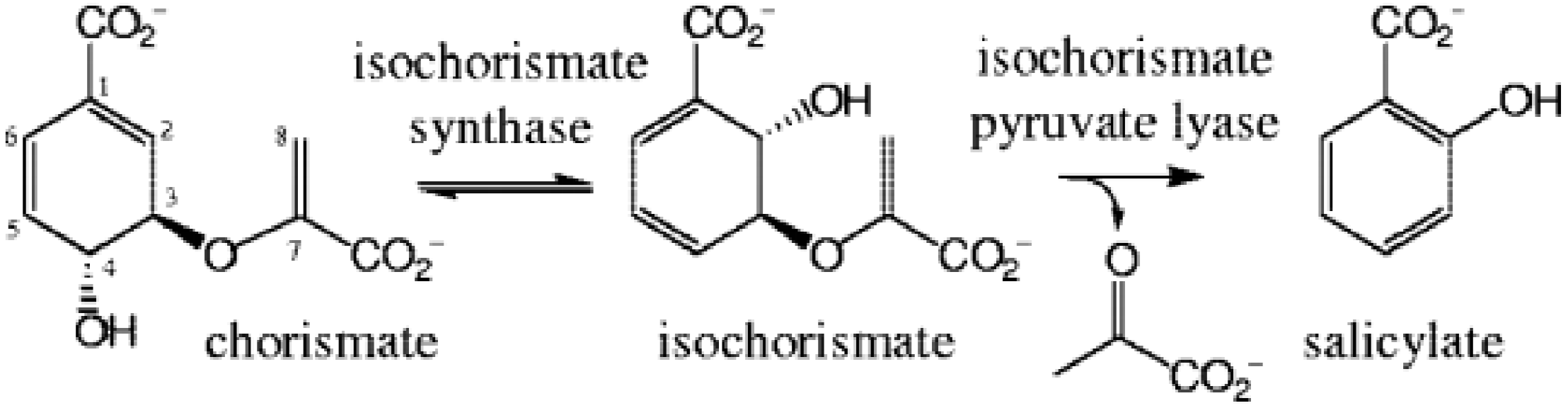


Biosintesis SA: Tumbuhan



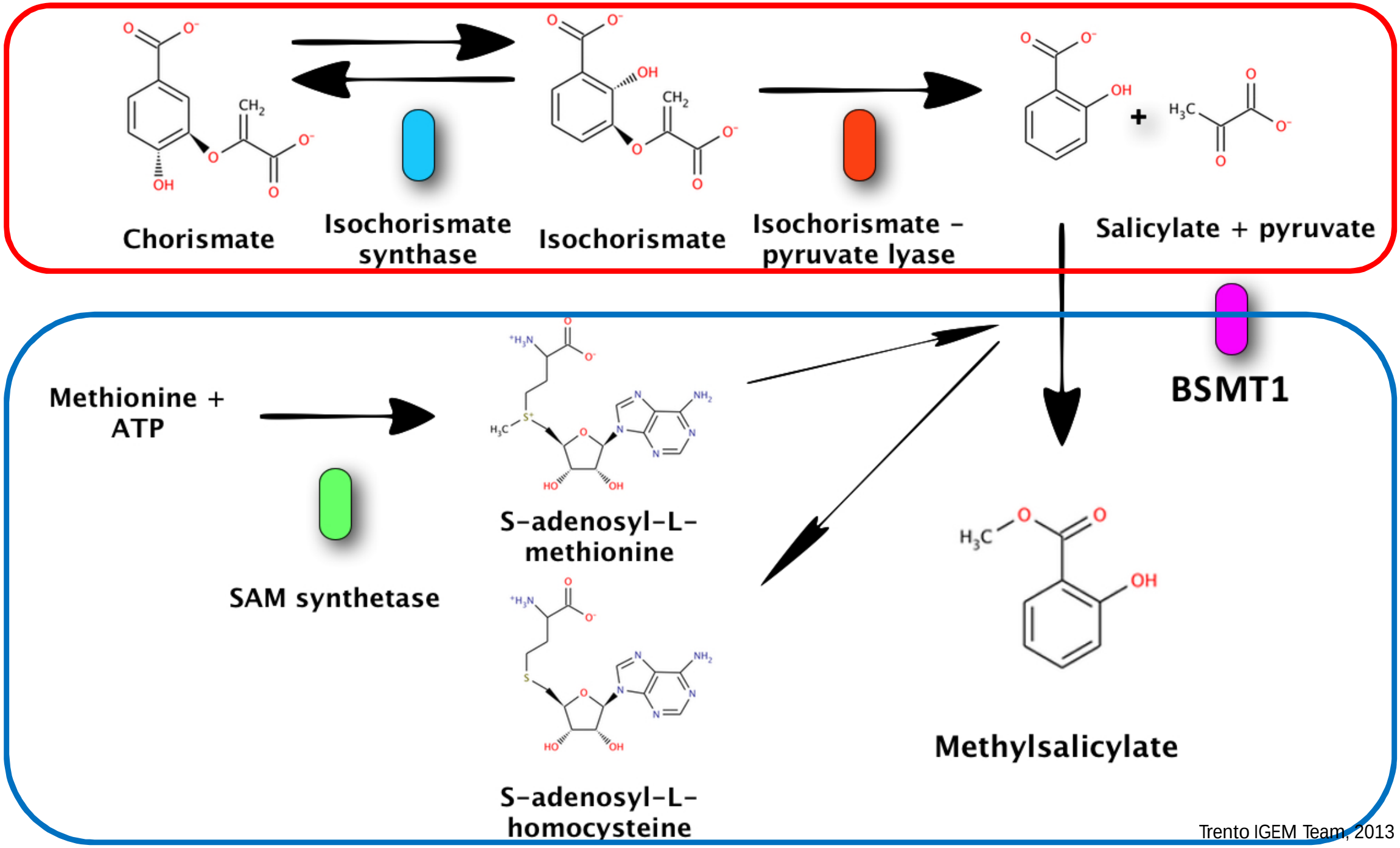
(Vicente & Placensia, 2011)

Biosintesis SA: Bakteri



(Kerbarh et al., 2005)

Desain sistem



Trento IGEM Team, 2013

Etilen

2

Reseptor Etilen

Penundaan
Pematangan

1

3

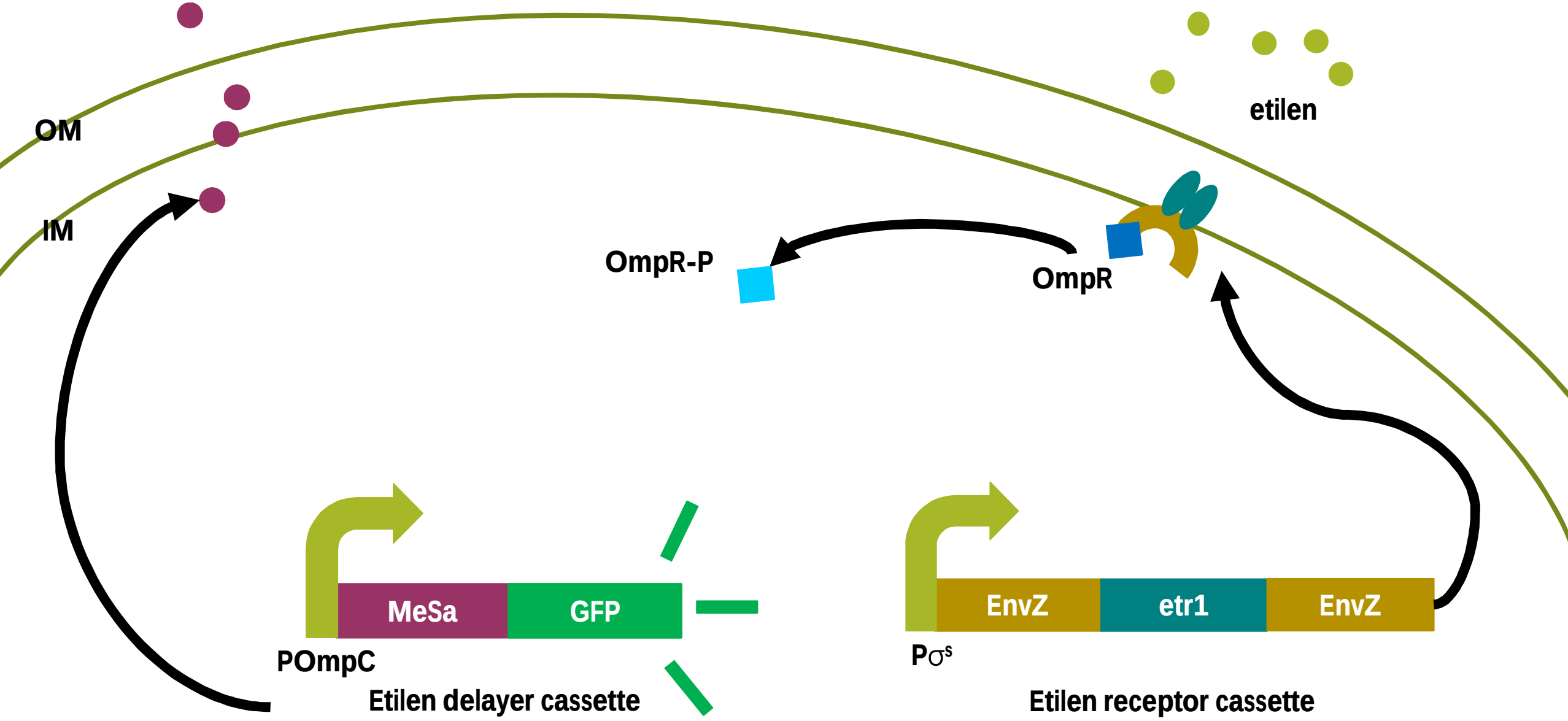
5

Ethylene receptor
cassette

Ethylene Delayer
cassette

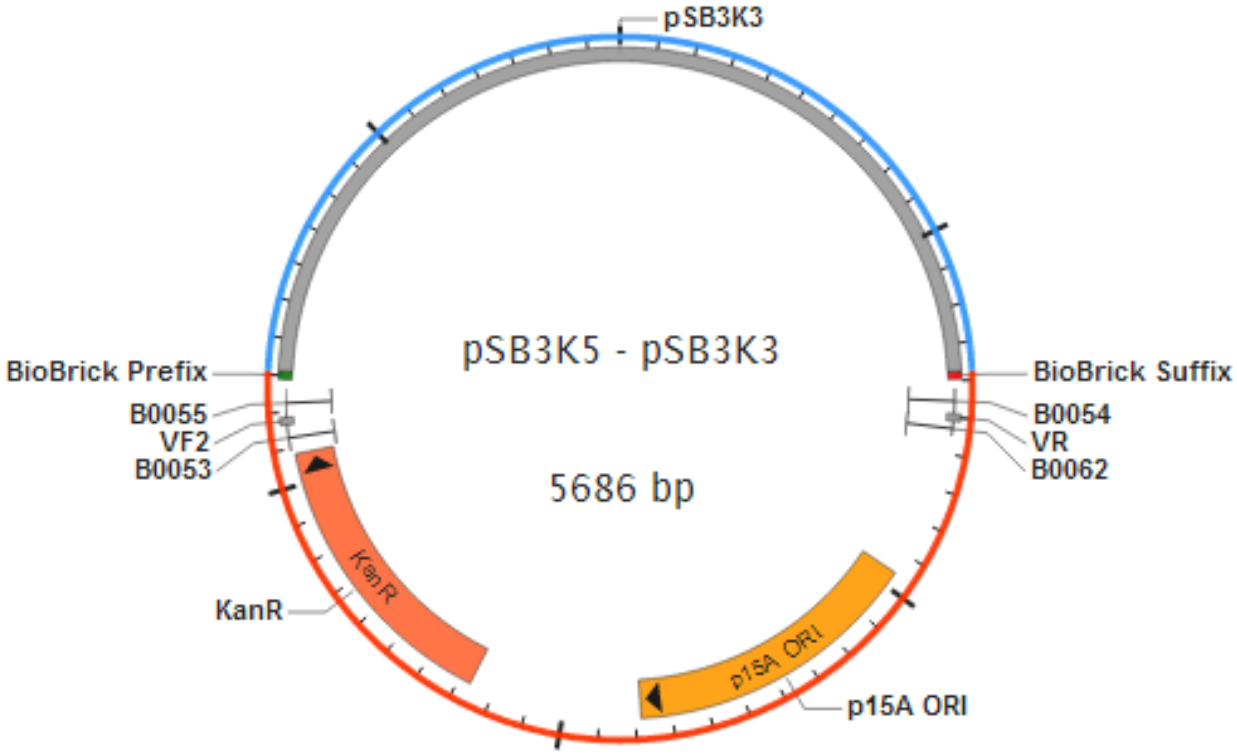
Metil Salisilat

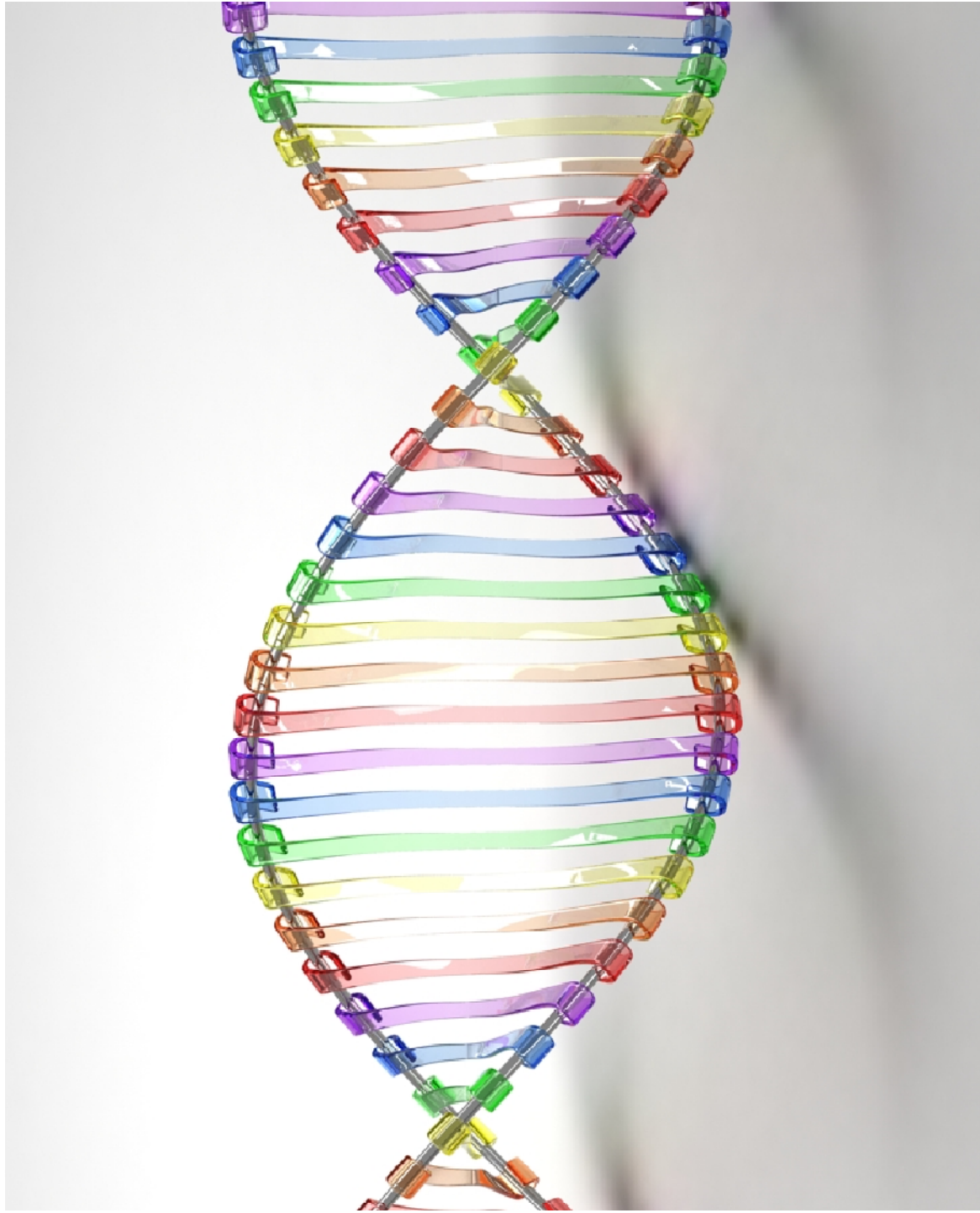
4


OM
IM
etilen
OmpR-P
OmpR
MeSa
GFP
POmpC
Etilen delayer cassette
EnvZ
etr1
EnvZ
Pσs
Etilen receptor cassette

Plasmid

Plasmid yang dipilih adalah plasmid *low copy number* (pSB3K3 / BBa_P1002)

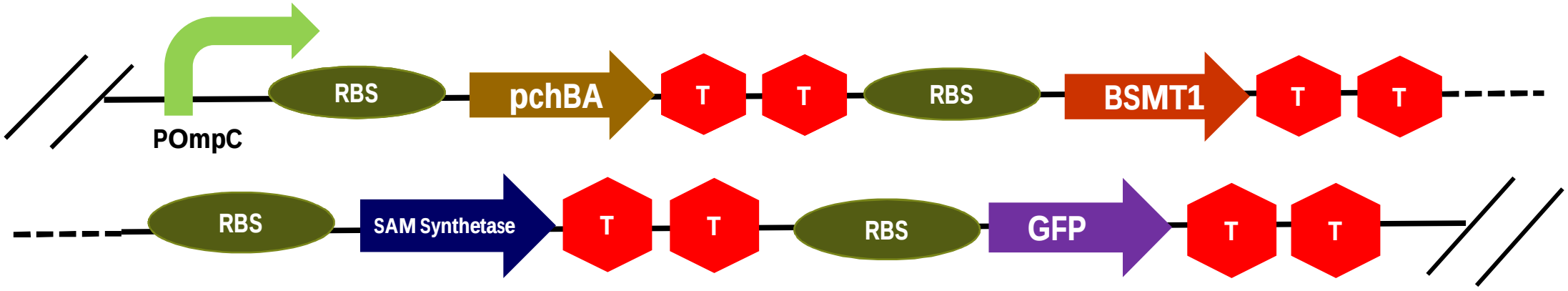




Ethylene Receptor Cassete

No Part/ Aksesi	Sekuens
BBa_J45992	promoter σ^s
BBa_J61100	RBS Anderson
947272	EnvZ
842951	etr1
B0010-B0012	Double Terminator

Ethylene Delayer Cassete



No Part/ Aksesi	Sekuens
K1165001	Promoter OmpC
BBa_J61100	RBS Anderson
BBa_K1065103	pchBA
BBa_K1065100	BSMT1
BBa_K1065104	SAM synthetase
BBa_K592010	gen gfp
B0010-B0012	Double Terminator

Referensi

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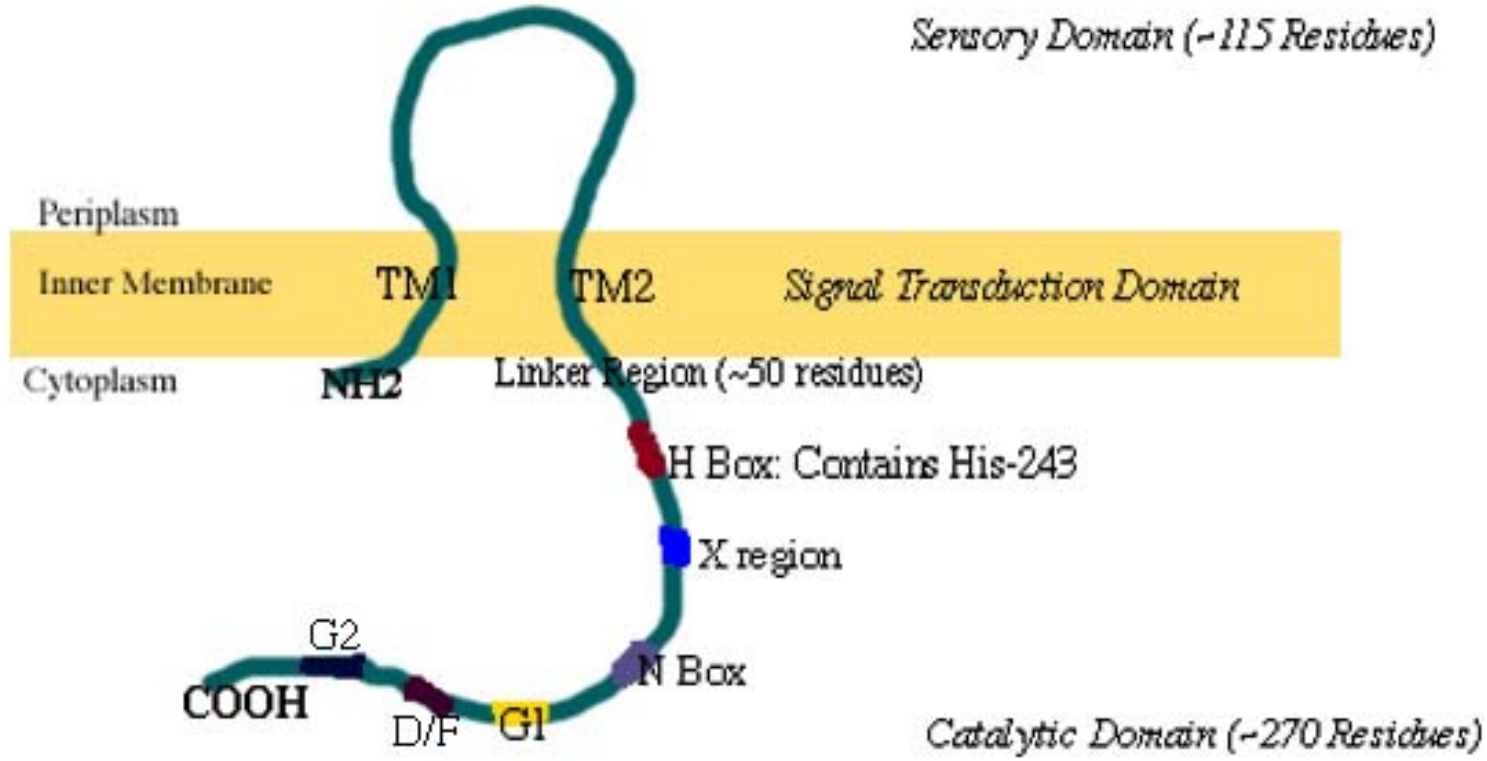
Terima kasih

Protein EnvZ



Adapted from Hsing, et.al. (15)