Reports on ABC

The Fundamental Analysis of Polyphenol Oxidases in Wheat(*T. aestivum*)

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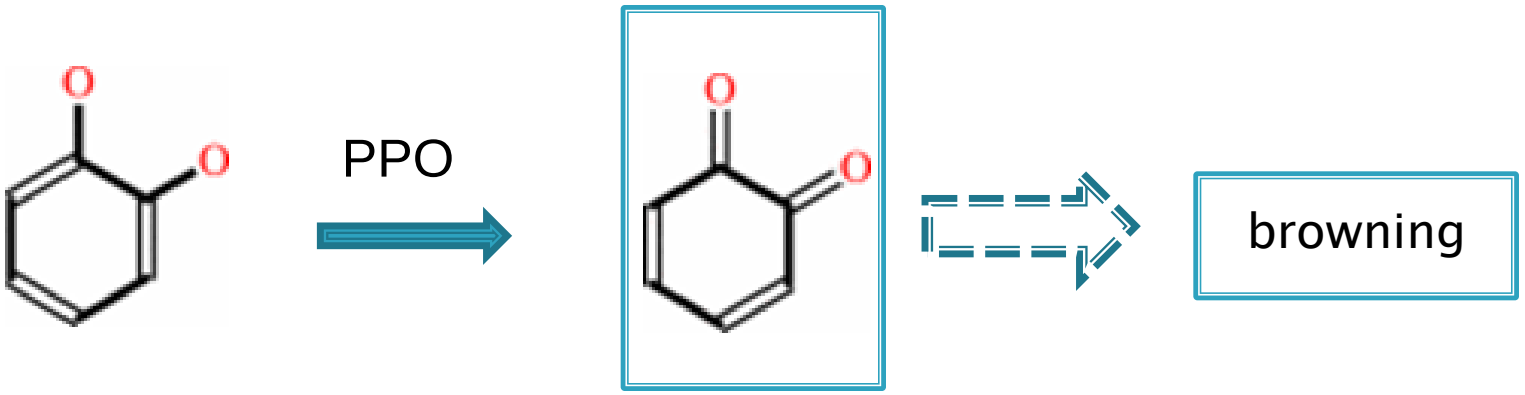
outline

- Introduction
- Methods and results
- Summary
- Supplemental analysis

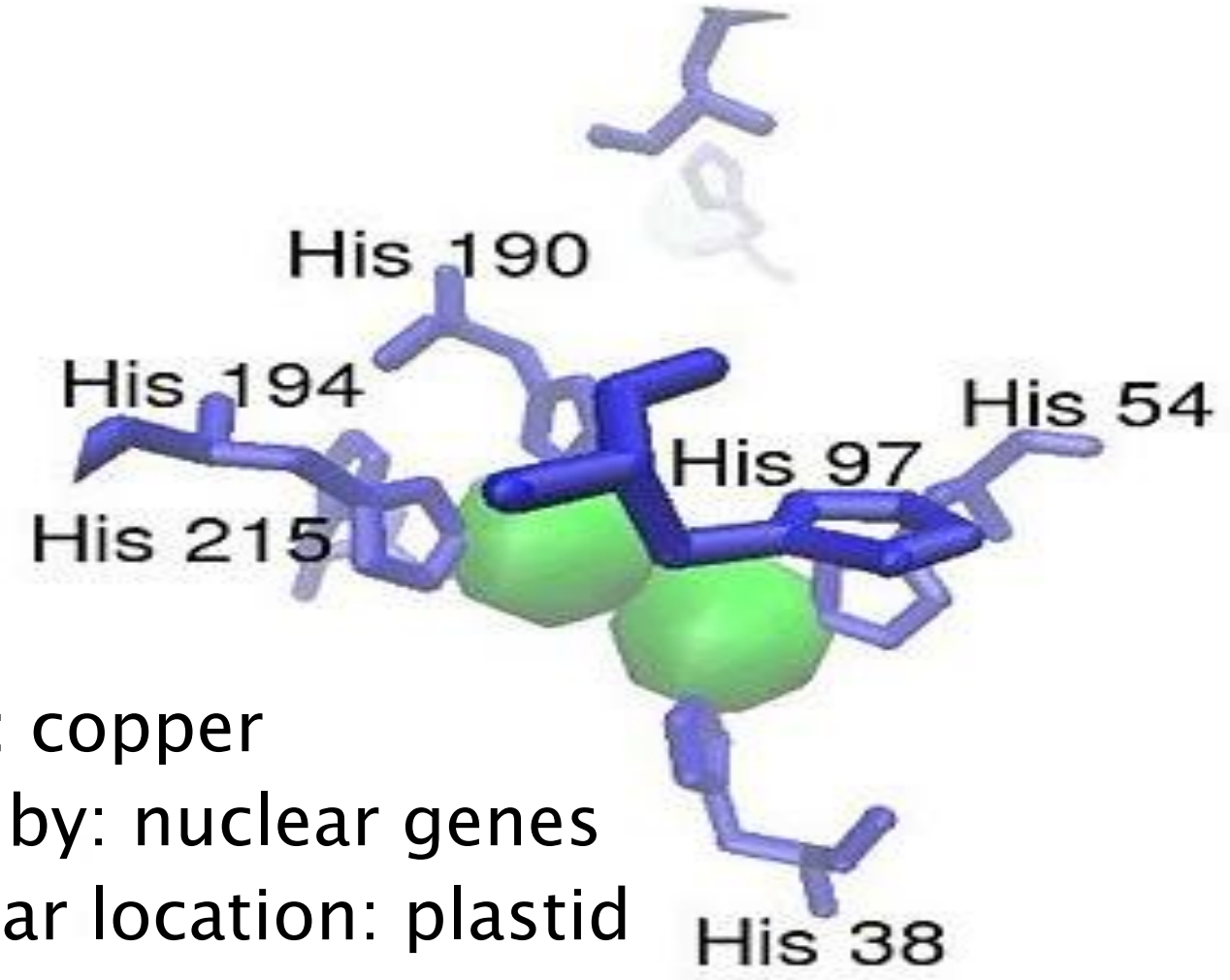
Introduction

What's PPOs and what can PPOs do ?

- Oxidordeuctase
- 2catechol + O_2 = benzoquinone + $2H_2O$



Introduction

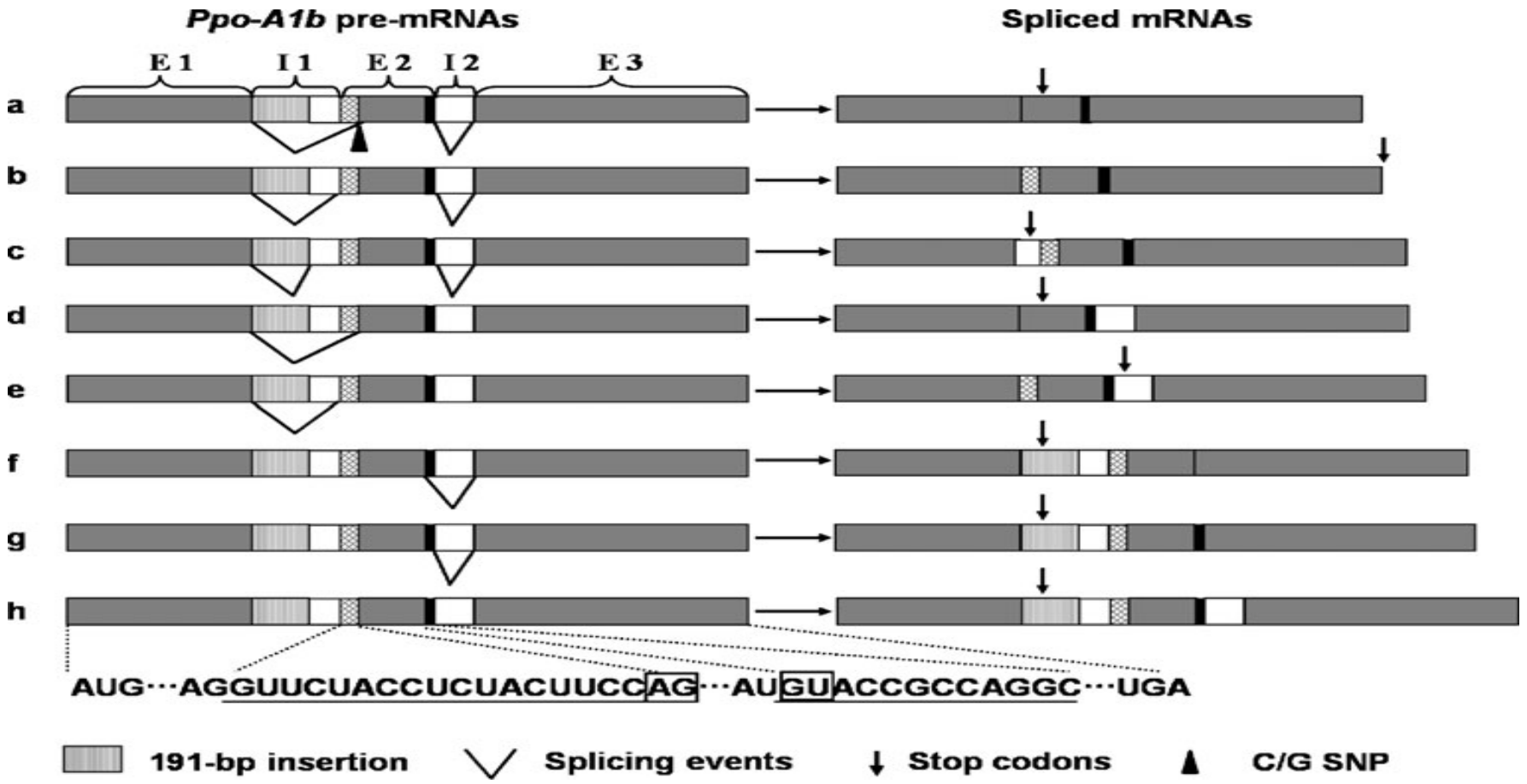


- Cofactor: copper
- encoded by: nuclear genes
- Subcellular location: plastid

Introduction

- Many PPO genes have been isolated in several plant species ,including broad bean, potato, grape, tomato, et al.
- In common wheat, He et al(2007) cloned the *Ppo-A1* gene on chromosome 2AL.
- A 191-bp InDel and seven SNPs were found between the two *PPO* alleles (*Ppo-A1a* and *Ppo-A1b*) .

Introduction



The constitutively and alternatively spliced mRNAs

Sun et al(2010)

Introduction

Gene expression

3D structure

?

Ppo-A1a Ppo-A1b

Methods and results

Sequences and structures

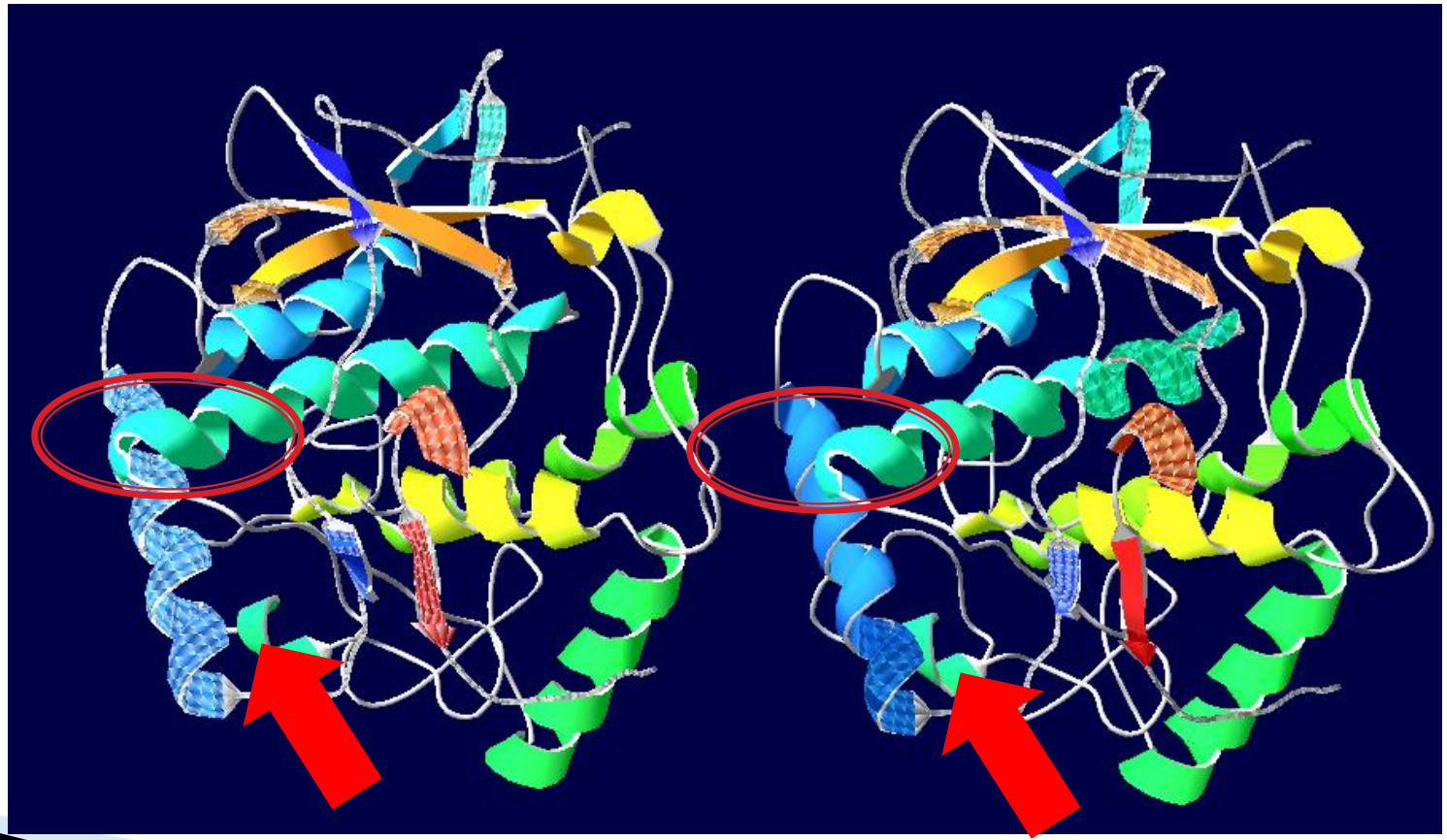
- *Ppo-A1a* (genebank: EF070147)
- *Ppo-A1b* (genebank: EF070148)

BlastP :Identities=572/577(99%)

	205	313	357	410	429
Ppo-A1a	H	G	I	M	G
Ppo-A1b	Q	S	M	T	S

Methods and results

Comparative modeling: SwissModel
Grape(PDB:2p3x), Identity :57%,58%



Ppo-A1a

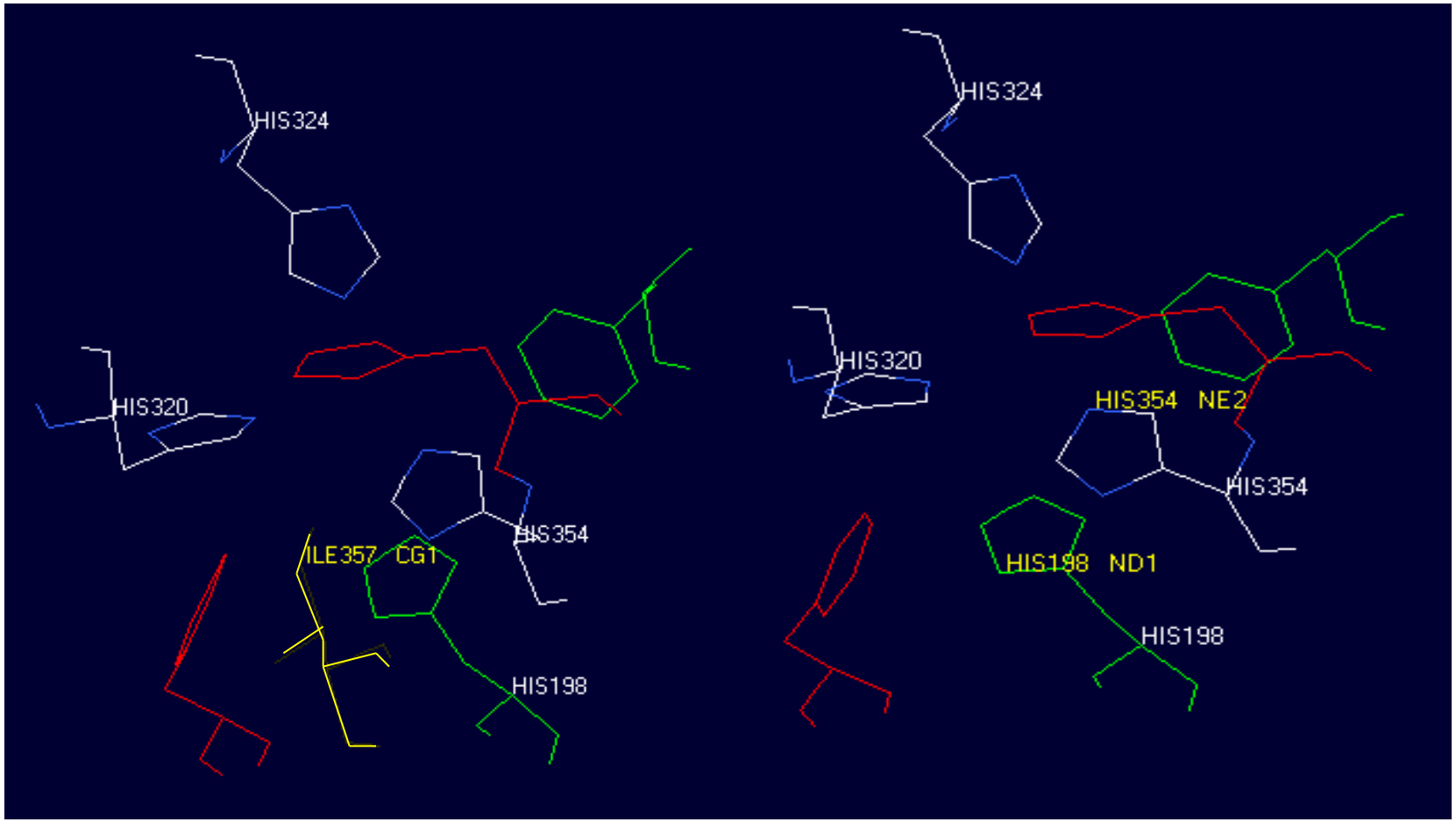
Ppo-A1b

Methods and results

Ppo-A1a

Ppo-A1b

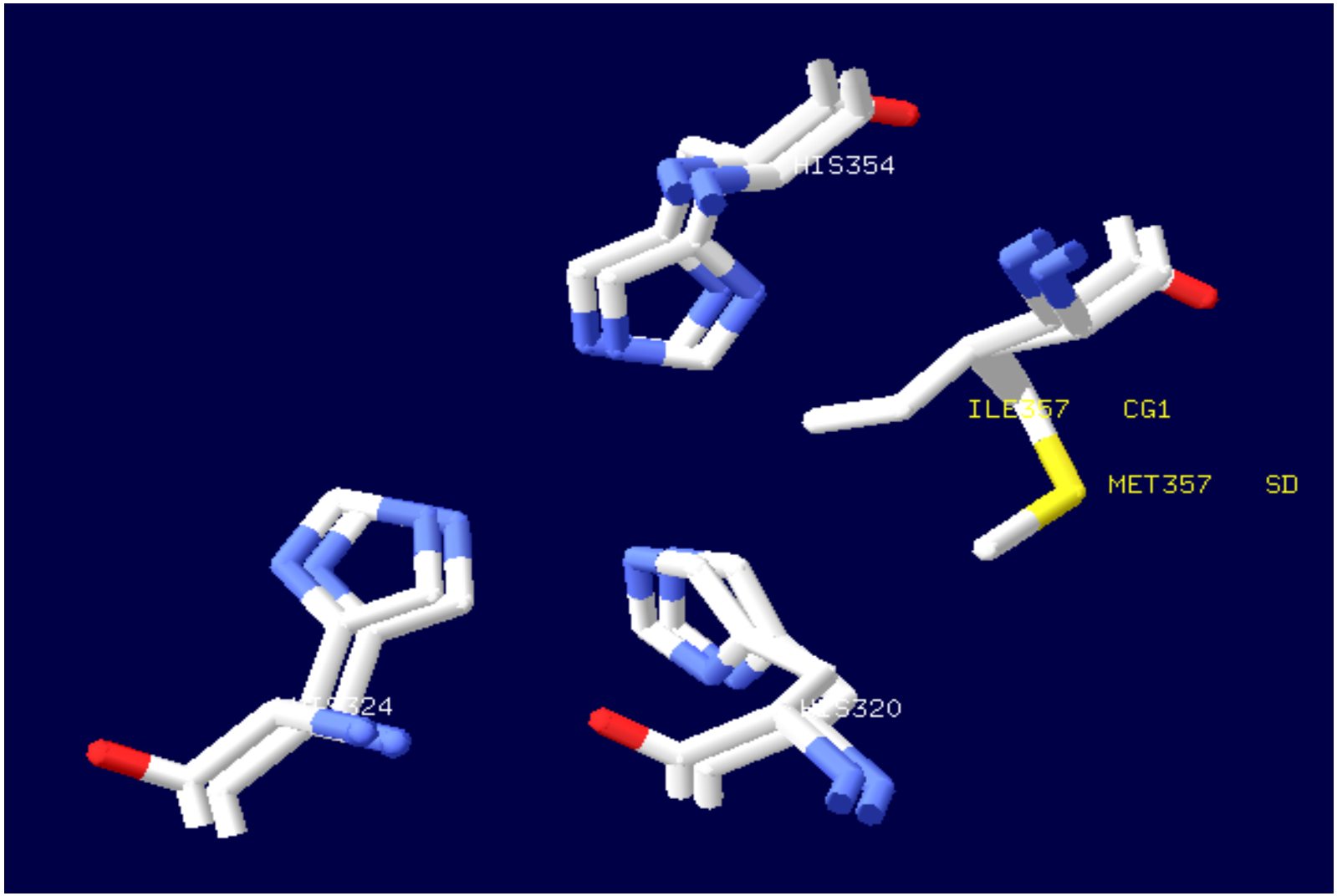
Methods and results



Ppo-A1a

Ppo-A1b

Methods and results



Ppo-A1a and Ppo-A1b

Summary

Ppo-A1a and Ppo-A1b

- 5 different amino acids
- Similar 3D structures
- Conformation variation
- 357 Site :M/I

Supplemental analysis

- Transmembrane prediction(TMHMM)
- Signal Peptide prediction(SignalP)
- Subcellular localization(ChloroP, TargetP)

Name	Len	cTP	mTP	SP	other	Loc	RC	TPlen
gi_118136326_gb_ABK6	577	0.833	0.472	0.004	0.025	C	4	45
cutoff		0.000	0.000	0.000	0.000			

Supplemental analysis

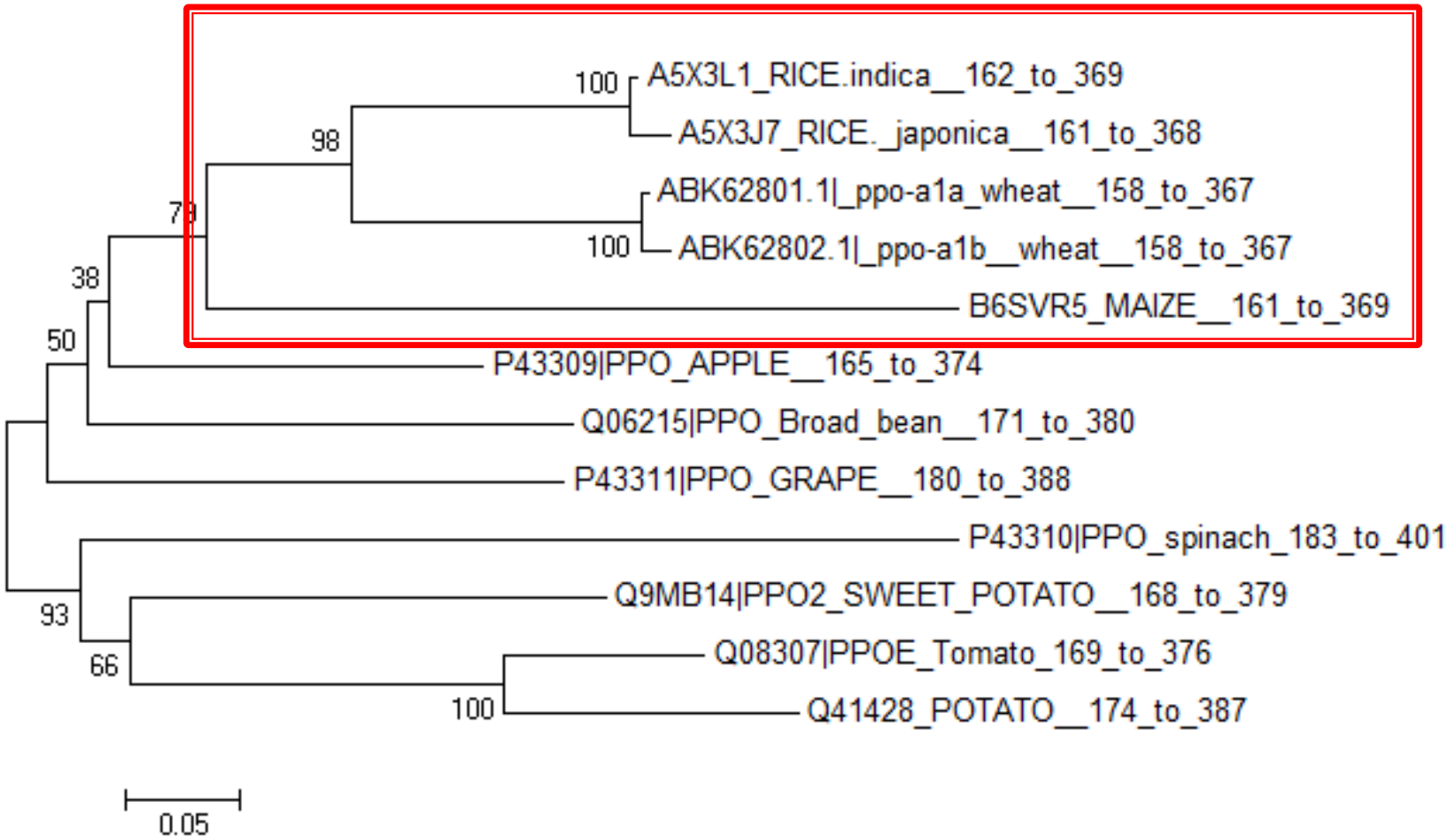
Confidently predicted domains, repeats, motifs and features:

Name	Begin	End	E-value
low complexity	60	72	-
low complexity	98	113	-
Pfam:Tyrosinase	158	367	1.90e-32
Pfam:PPO1_DWL	373	426	4.00e-24
Pfam:PPO1_KFDV	439	575	1.80e-41

Supplemental analysis

	I	L	G	K	L	I	N	K	P	D	F	A	L	P	Y	W	N	W	D	H	R	D	G	M	R	I
1. P43310|PPO_spinach_183_to_401	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2. Q08307|PPOE_Tomato_169_to_376	.	.	.	S	.	.	.	D	.	T	.	.	.	.	.	.	.	.	.	.	P	K	.	.	.	.
3. P43311|PPO_GRAPE__180_to_388	.	.	A	.	.	.	D	D	.	T	.	.	.	.	.	.	A	.	.	N	P	.	.	.	Y	M
4. Q06215|PPO_Broad_bean__171_to_380	.	.	.	S	.	.	.	D	.	T	.	.	.	.	F	.	.	Y	.	A	P	.	.	.	Q	L
5. P43309|PPO_APPLE__165_to_374	.	.	.	.	.	.	.	D	.	T	.	.	.	.	F	.	.	.	.	S	P	A	.	.	P	L
6. Q41428_POTATO__174_to_387	.	.	.	.	.	.	D	D	.	T	.	.	.	.	.	.	.	.	.	.	P	K	.	.	.	L
7. Q9MB14|PPO2_SWEET_POTATO__168_to_37	.	.	.	.	.	.	G	D	.	T	.	G	.	.	F	.	.	.	.	T	P	A	.	.	L	.
8. B8SVR5_MAIZE__161_to_369	V	A	A	R	.	L	G	D	.	G	.	.	V	.	F	.	S	.	.	V	P	E	.	.	.	V
9. A5X3L1_RICE.indica__162_to_369	.	.	.	.	.	.	G	D	E	T	.	.	.	.	F	.	.	.	.	A	P	.	.	.	S	F
10. A5X3J7_RICE._japonica__161_to_368	.	.	.	.	.	.	G	D	E	T	.	.	.	.	F	.	.	.	.	A	P	.	.	.	S	F
11. ABK62801.1|_ppo-a1a_wheat__158_to_367	.	.	.	.	.	.	G	D	D	T	.	.	.	.	F	.	.	.	.	A	P	A	.	.	T	L
12. ABK62802.1|_ppo-a1b__wheat__158_to_367	.	.	.	.	.	.	G	D	D	T	.	.	.	.	F	.	.	.	.	A	P	A	.	.	T	L

Supplemental analysis



Thanks

Many thanks to Dr.Luo !

We enjoy the class very much !

Best wishes to all of you!