PDI

Fig.1 The structure of PDI protein from *Homo sapiens*

; Trx:

; KDEL:

thaliana PAt) *Oryza sativa*

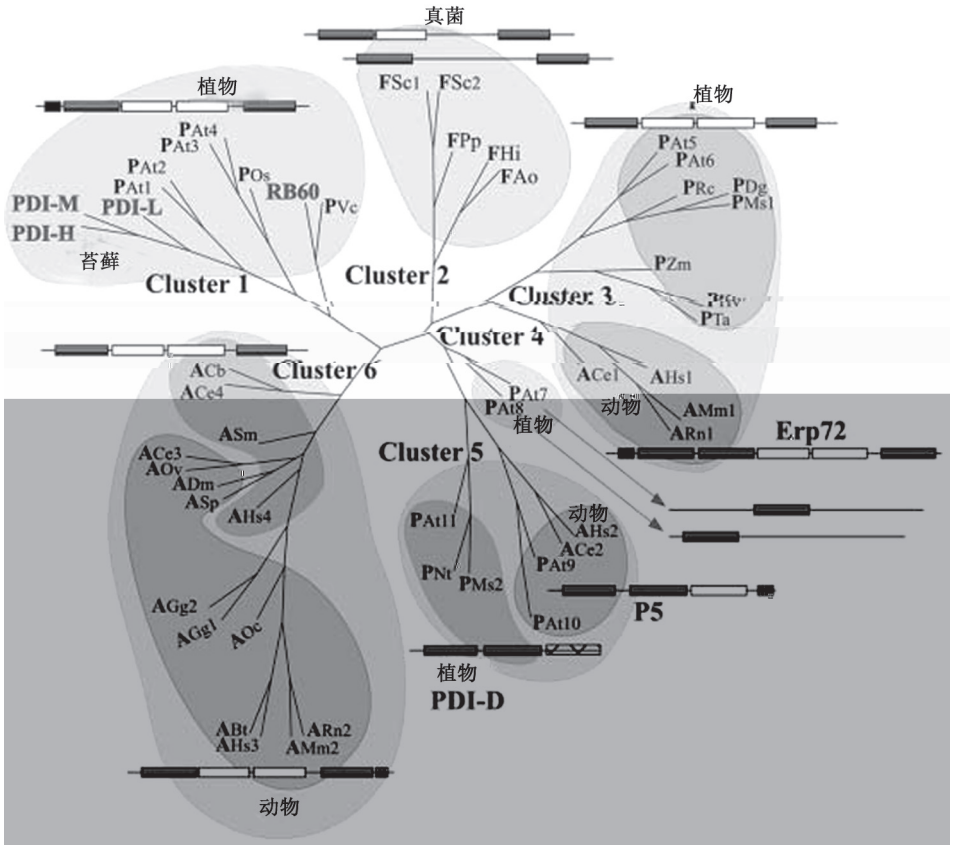
Physcomitrella patens, PDI-H, M, L) PDI

PDI, a' b a'

Zea mays

(*Ricinus communis*, PRc) *Medicago sativa* *Triticum aestivum*

Hordeum vulgare



PDI

Fig.2 An unrooted phylogenetic tree based on 51 PDI-like protein sequences

PDI 62.25 kDa GenBank

PDI

PDI D D ERp28/ "- ---- -"

ERp29 *Nicotiana tabacum* PDI; PDIL, "- - ----" PDIL, "- --"

PDI (a, b, b', a') PDIL PDILs

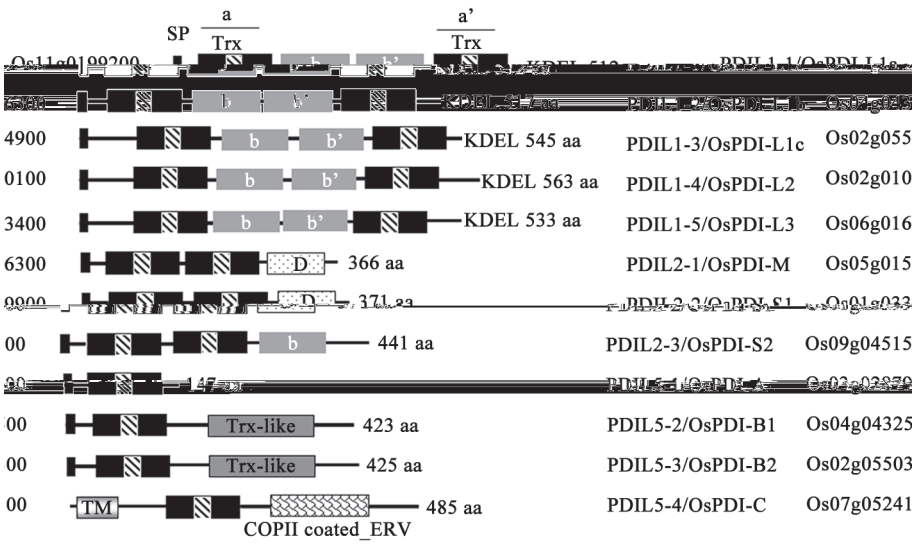
Lu

PDI

PDI, PDI PDI

OsPDILs

16.28 kDa



PDI

DIL

Trx ل *D* ا Lu ن

COPII *J* ن *ARMET* PDIs؛ : PDI-A

, RT-PCR PDIs ه

PDI-B (-a-b-b'-) PDI-C (-TM-a-*COPII*

AtPDI1 *AtPDI5* *AtPDI9* *AtPDI12* ن *AtPDI6*

ä̈

AtPDI3 *AtPDI4* *AtPDI2* ن *AtP-*

PDI-D (-*J* *ARMET* *J* DnaJ؛

DI7

ARMET

ه ؤُ

ا PDI-E (-a-TM-) PDI-F (-a-*C-ter α-helic*

(Lu ن

α PDI-L (-a-b-b'-a'-, شخ

PDI

PDI PDI-M (a°-a-b-) ن PDI-S (a° *D* *D*

AtPDI5

ɨ ERp28/ERp29 ؛

ن

؛ OsPDIL5-1

ن PDI (Ciaff

PDI-A , OsPDIL5-2 ن OsPDIL5-3 B

Liu ؤُ PDI

DIL5-4 , OsPDIL1-1~5 ؤُ L

(Sweetlove 2002; Liu

DIL2-3 , OsPDIL2-1 ن OsPDIL2-2

SIGnAL ‟

؛ ل ً ؤُ ؛ OsPDILs , GA ا

OsPDIL1-2 *OsPDIL1-4* *OsPDIL5-3* ن *OsP-*

PDILs *PDILs*

DIL5-4 *OsPDIL1-2* ا ◻

PDILs ن *PDILs*

ABA *OsPDIL1-1* ه ABA

؛ ه ABA ط

d'Aloisio ن

3 PDI

2 PDI

PDI (ER) ا

PDILs ا

يم

ا ؛ ن

؛ PDIL cDNA, mRNA ن

rindrasorasak

؛ ؤُ , SPPDI1 يم

؛ ل PDILs

ن ا ه ن

ا ً ل ا

(Trebitsh 2001; Levitan 2005; Lu
Liu
PDI
PDILs

4 PDI

4.1

PDI

Cu/ZnSOD,

(Kaminaka

, PDI

, PDI

PDI

GSSG

(Wilkinson Gilbert 2004)

PDI,

RNase A

Gruber *Old-*
enlandia affinis
PDI (OaPDI)

PDI (hPDI)
OsPDIL2-3
-PDIL2-3,
PDIL2-3 α-

4.2

”

Gilbert (1994)
PDI

, PDI

Methanothermobacter thermoauto-
trophicum
MTH1745

(Ding
PDI Gruber

, OaPDI hPDI
Lu
DTT) β-Me)
AtPDIs
(UPR) PDI
ER PDI

5 PDI

5.1

PDI
(Takemoto 2002; Li

Li Larkins (1996)
PDI
esp2 , PDIL1-1

RT-PCR

PDI RT-PCR

ABA

(Liu

(2-DE)

(MALDI-TOF-MS)

(LC-ESI-MS/MS)

(Pb)

DnaK

AtCCH (PDI

PDI (PDI

PDI

PDI

PDI

PCR

PDILs *OsPDIL1-1* *OsPDIL1-3* *OsPDIL5-1* *OsPDIL5-2* *OsPDIL5-3* *OsPDIL1-2*

OsPDILs

PDILs

, PDIL1-1

PCR RT-PCR PDILs

, PDIL1-1 *T3612* PDIL2-3

PDIL1-1

T3612

kDa

, PDIL1-1

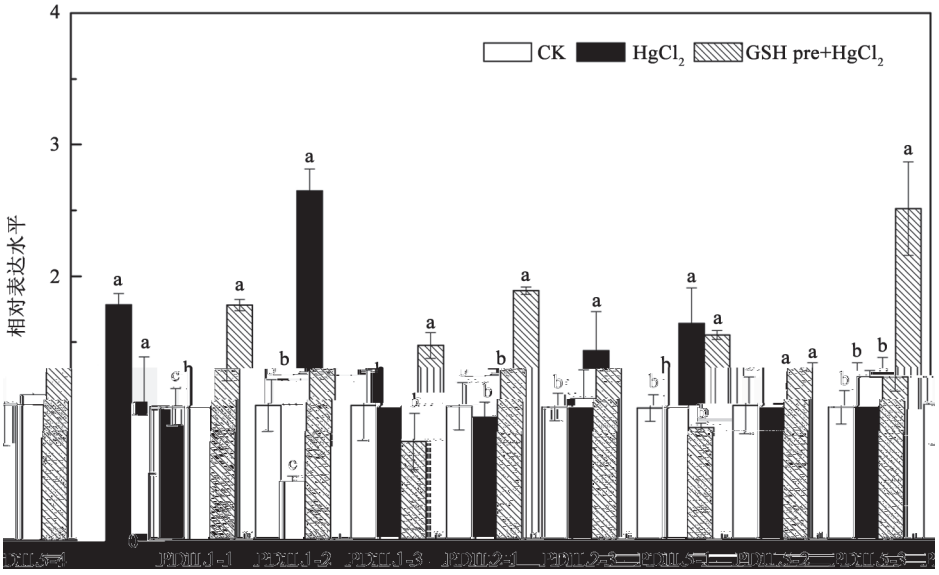
PDIL1-1

AtPDI5

PDI

5.2

PDI



GSH pre+Hg *PDILs*

Fig.4 Gene expression of *PDILs* and GSH pre+Hg

P

PDILs PDILs *MTH1745*

GSH 2012b)

PDI

5.3 PDI

SPPDI1 (DHA) L- (AsA) SPPDI1

DHA NADH

, SPPDI1 AsA

, SPPDI1

6

PDI

PDI

PDI

PDI

PDI

PDI

PDI

PDI cDNA

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