Table A1. Enzymes involved in PTMs of EXTs. *Cr: Chlamydomonas reinhardtii*; *Dc:Daucus carota; Dca:Dianthus caryophyllus; Gv;Vitis vinifera; La:Lupines albus ;Nt: Nicotiana tabacum; Pv: Phaseolus vulgaris; Pp:Physcomitrella patents; Sl: Solanum lycopersicum; Vr: Vinca rosea; Vc: Volvox carteri.*

Gene/Protein name	*In vitro* activity	*In vivo* activity	Sub-cellular localization	Organ localization	Enzyme activity/Phenotype	Reference
Prolyl 4-Hydroxylases (P4Hs)						
AtP4H1 (At2g43080)	yes	-	ER, Golgi	-	Hydroxylates poly (L-Pro), synthetic peptides and $(Pro\text{-}Pro\text{-}Gly)_{10}$/*AtP4H1* OX plants showed hypoxia-in-normoxia phenotype. Increased root hair length, absence of trichome, and reduction in seed size	(Hieta and Myllyharju, 2002) (Asif et al., 2009)
AtP4H2 (At3g06300)	yes	-	ER, Golgi	Root, Root hairs	-/Short root hairs	(Velasquez et al., 2011) (Tiainen et al., 2005)
AtP4H5 (At2g17720)	yes	-	ER, Golgi	Root, Root hairs	Hydroxylates EXTs preferentially. Interacts with P4H2 and P4H13/Short root hairs	Velasquez et al. (2014b)
P4H13 (At2g23096)	-	-	ER, Golgi	Root, Root hairs	-/Short root hairs	(Velasquez et al., 2011)
Cr-P4H1	yes	-	-	-	Hydroxylates Poly (L-Pro), *C. reinhardtii* HRGP Motifs, and collagen-like peptides/Crystal structure available/Defective cell wall consisting of a loose network of fibrils	(Keskiaho et al., 2007)
DcaP4H1	yes	-	-	Ovaries	Hydroxylates poly (L-Pro), synthetic Pro-rich peptides (similar to plant EXTs and AGPs)/Involved in climacteric ethylene production in cut carnation flowers	(Vlad et al., 2010)
DcaP4H2	yes	-	-	Stems, Petals	Hydroxylates poly (L-Pro)/Involved in climacteric ethylene production in cut carnation flowers	(Vlad et al., 2010)
SlP4H1, 7,9	-	-	-	Root, Root hairs	-/P4H-silenced plants had longer roots and shoots and larger leaves. Reduced levels of EXT and AGP in silenced SlP4H7, 9. Only reduced levels of AGP in silenced SlP4H1	(Fragkostefanakis et al., 2014)
VcP4H	yes	-	-	-	Hydroxylates Poly (L-Pro)/-	(Kaska et al., 1988)
PpP4H1,2,3,4,5,6a, 6b	-	-	Secretory compartments	-	-/Reduced levels of Hyp on recombinant human erythropoietin in PpP4H1 mutant	(Parsons et al., 2013)
BY2-P4H	-	-	ER, Golgi	-	Hydroxylates $(Pro\text{-}Pro\text{-}Gly)_{10}$/-	(Yuasa et al., 2005)
P4H	yes	-	ER	-	Hydoxylates poly (L-Pro)/ Its activity can be induced by an elicitor preparation from the fungus *Colletotrichum lindemuthianum*	(Bolwell et al., 1985)
DcP4H	yes	-	Cytoplasm	-	Hydroxylates Pro residues of protocollagen isolated from chick embryos/-	(Sadava and Chrispeels, 1971)
VrP4H	yes	-	-	-	Hydroxylates octa-L-Pro and poly (L-Pro)/-	Tanaka et al. (1980)
Glycosyltransferases (GTs)		-	-	-		
AtHPAT1 (At5g25265)	yes	yes	Golgi	-	-/Impaired pollen tubes growth, enhanced hypocotyl elongation, and early flowering	(Ogawa-Ohnishi et al., 2013)
AtHPAT2 (At2g25260)	yes	yes	Golgi	-	-/Impaired pollen tubes growth, enhanced hypocotyl elongation, and early flowering	(Ogawa-Ohnishi et al., 2013)
AtHPAT3 (At5g13500)	yes	yes	Golgi	-	-/Impaired pollen tubes growth, enhanced hypocotyl elongation, and early flowering	(Ogawa-Ohnishi et al., 2013)
AtRRA1 (At1g75120) AtRRA2 (At1g75110)	-	-	Golgi	-	-/Short root hairs	(Petersen et al., 2011) (Egelund et al., 2007)
AtRRA3 (At1g19360)	-	-	Golgi	-	-/Short root hairs	(Velasquez et al., 2011)
AtXEG113 (At2g35610)	-	-	Golgi	-	-/Short root hairs	(Velasquez et al., 2011)
AtSGT1 (At3g01720)	-	yes		Root, Root hairs	Ser galactosyltransferase activity/Short root hairs/Reduced levels of Gal in the mutant	(Saito et al., 2014) (Velasquez et al., 2014)
Peroxidases (PERs)						
AtPER3 (At1g05250)	-	-	-	-	-/Short root hairs	(Velasquez et al., 2014)
AtPER3L (At1g05240)	-	-	-	-	-/Extra long root hairs	(Velasquez et al., 2014)
AtPER8 (At1g34510)	-	-	-	-	-/Short root hairs	(Velasquez et al., 2014)
AtPER44 (At4g26010)	-	-	-	-	-/Extra long root hairs	(Velasquez et al., 2014)
AtPER73 (At5g67400)	-	-	-	-	-/Short root hairs	(Velasquez et al., 2014)
GvEP1	-	yes	-	-	Crosslinks EXTs/-	(Jackson et al., 2001)
pI 4.6 extensin PER	-	yes	-	-	Crosslinks EXTs/-	(Schnabelrauch et al., 1996)
La1 (LEP1)	-	yes	Apoplast	-	Crosslinks EXTs/-	(Price et al., 2003)

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