Table 1 Suppl. Representative studies depicting the role of exogenous application of polyamines, glycine betaine, proline, and reactive oxygen species in cold/freezing stress tolerance**.**

Regulators	Concentrations [mM]	Temperature [°C]	Plant species	Effect on growth and related attributes	References
Spermidine (Spd)	0.5, 1.0, 2.0	5	*Triticum aestivum*	Alleviates injury caused by chilling stress by improving the activity of antioxidant enzymes	Abdel Kader *et al*. 2011
Putrescine (Put)	1.0	12	*Dracocephalum*	Increased anthocyanins, flavonoids, phenolic compounds and peroxidase activity	Abavisani *et al.* 2013
Spd + Put	0.5, 1.0	15	*Cucumis sativus*	Pretreatment with Put and Spd decreases electrolyte leakage and malondialdehyde content	Zhang *et al.* 2009
Glycinebetaine (GB)	50, 100, 200	12, 15, 18	*Vitis vinifera*	Improved photosynthetic rate and leaf water relations	Mickelbart *et al.* 2006
	10	-3.1 to -4.5	*Arabidopsis thaliana*	Improved cold stress tolerance by increasing leaf thickness and dark green colour of leaves	Xing and Rajashekar 2001
	5 - 40	15	*Saccharum officinarum*	Decreased accumulation of H_2O_2, while increased K^+, Ca^{2+}, proline, GB, and soluble sugar content	Rasheed *et al.* 2010
	50, 100, 200	12, 18	*V. vinifera*	Only photosynthetic rate of GB-treated plants increased, while other attributes remain unaffected	Mickelbart *et al*. 2006
	2.0	-7, -10	*Fragaria* × *ananassa*	Enhanced cold tolerance almost two-fold in terms of freezing survival and regrowth of whole plants	Rajashekar *et al.* 1999
	0.1-10	3	*Lycopersicon esculentum*	GB-treated plants maintain a lower content of H_2O_2 and a higher catalase activity than non-treated plants	Park *et al*. 2006
	1	≤ 10	*Cicer arietinum*	Increased seed yield per plant, number of seeds per pod, number of pods per plant and seed mass, while reduced electrolyte leakage	Nayyar *et al.* 2005
Proline	1.0, 10, 100	4	*Larix leptoeuropaea; Picea sitchensis; Quercus robur*	Improved cold tolerance by enhancing plant growth	Gleeson *et al.* 2004
	Not mentioned	2	*Solanum* spp.	Increased cold tolerance due to a high accumulation of proline	Swaaij *et al.* 1985
	5 - 40	15	*S. officinarum*	Decreased accumulation of H_2O_2, while increased K^+, Ca^{2+}, proline, GB, and soluble sugar content	Rasheed *et al.* 2010
	5.0, 10, 15, 20	4	*Brassica napus*	Considerable increase in endogenous proline content in shoots which results in enhanced cold stress tolerance	Jonytiene *et al.* 2012
	10, 20, 30, 40, 50	3	*Daucus carota*	Improved plant growth and freezing tolerance	Shane 1986
Hydrogen peroxide	15, 20 mM	4	*B. juncea*	Increased germination rate as well as shoot and root lengths	Kumar *et al.* 2010

Table 2 Suppl. Selected plants transformed with certain gene(s) for their improved cold-acclimation or tolerance.

Plants transformed	Genes or/and gene products	References
Arabidopsis thaliana	proline dehydrogenase (*prodh*)	Nanjo *et al*. 1999
	aminophospholipid ATPase 1 (*ala1*)	Gomes *et al*. 2000
	abscisic acid induced protein (*abi3*)	Tamminen *et al*. 2001
	Osmyb4	Vannini *et al*. 2004
	C2H2 zinc finger (*ZAT12*)	Vogel *et al*. 2005
	chloroplast stromal protein (*Cor15am*)	Nakayama *et a*l. 2007
	Acyl-CoA-binding protein (*ACBP6*)	Chen *et al*. 2008
	cold shock protein (*AtCSP3*)	Kim *et al*. 2009
	regulator of osmotic stress tolerance (*mybc1*)	Zhai *et al*. 2010
	thermal hysteresis proteins (Antifreeze protein) (*ThpI*)	Zhu *et al*. 2010
	MdCIbHLH1(basic helix-loop-helix)	Feng *et al*. 2012
	CBF expression 1 (*ice1*)	Lee *et al*. 2005
	ICE2	Fursova *et al*. 2009
	CBF1 induced COR gene	Jaglo-Ottosen *et al*. 1998
	DREB1A/CBF3 and DREB2A	Maruyama *et al*. 2009
	CAMTA	Doherty *et al*. 2009
	SIZ1	Miura *et al*. 2007
	ICE1 (inducer of CBF expression)	Yamaguchi-Shinozaki and Shinozaki 2006
	At PP2CA and NPK1	Kovtun *et al*. 2000
Glycine max	cold-inducible zinc finger protein (*SCOF1*)	Kim *et al*. 2001
Nicotiana tabacum	glycerol 3-phosphate acyltransferase (*gpat*)	Murata *et al*. 1992
	superoxide dismutase (*sod*)	Sen Gupta *et al*. 1993
	glutathione *S*-transferase and glutathione peroxidase (*gst/gpx*)	Roxas *et al*. 1997
	omega-3-fatty acid desaturase gene (*FAD7*)	Kodama *et al*. 1994, Khodakovskaya *et al*. 2006
	citrus dehydrin (*CuCOR19*)	Hara *et al*. 2003
Oryza sativa	R2R3-type protein (*HOS10*)	Zhu *et al*. 2005
	DNA-binding domain (*OsMYB3R-2*)	Ma *et al*. 2009
	DNA-binding repeat MYB (*MYBS3*)	Su *et al*. 2010
Triticum aestivum	CCGAC sequences like CRT/DREs in its promoter (*WCS120/COR39*)	Ouellet *et al*. 1998
Malus domestica	*MdCBF2* (basic helix-loop-helix)	Feng *et al*. 2012
Brassica napus	*GSTF2, TRXh5, LTI30*, and *LACS4*	Jeong *et al*. 2012
Vitis vinifera	*AtDREB1b*	Jin *et al.* 2009

Table 3 Suppl**.** Major examples of C-repeat/DRE-binding factor (CBF) / dehydration-responsive element (DRE) B factor significance in plant cold acclimation/tolerance.

CBF/DREB factor	Plants transformed	Sequence from	Temperature [°C]	Observed features	Reference
CBF1, CBF2, CBF3	*Brassica napus*	*Arabidopsis thaliana*	4	Increased freezing tolerance of both non-acclimated and cold-acclimated plants due to cold induced CBF expression	Jaglo *et al*. 2001
CBF1	*Populus balsamifera*	*A. thaliana*	5	Improved freezing tolerance; CBF paralogs show differential expression in leaf (annual) and stem (perennial) tissues	Benedict *et al*. 2006
CBF1	*Hordeum vulgare*	*H. vulgare*	2	Induction of HvCBF1 in response to cold; increase in transcription of *HVA1*	Xue 2002
CBF1, CBF2, CBF3	*A. thaliana*	*A. thaliana*	5	Increases freezing tolerance by improving growth, proline, and sugar content	Gilmour *et al*. 2004
DREB1A/CBF3	*Nicotiana tabacum*	*A. thaliana*	1	Improved drought and low temperature stress tolerance	Kasuga *et al*. 2004
DREB1/CBF homolog, ZmDREB1A	*A. thaliana*	*Zea mays*	4	Higher tolerance to drought and freezing stress	Qin *et al.* 2004
WRKY	*Triticum aestivum*	*T. aestivum*	4	Cold resistance in both winter wheat and spring wheat is related to the enhancement in expression of genes for transcription factors CBF4, MYB80, Wabi5, Wrab17, Wrab19, Wcor15, and Wcs120.	Talanova *et al*. 2011
ICE1 (inducer of CBF expression 1)	*A. thaliana*	*A. thaliana*	0	Improved cold and freezing tolerance in transgenic *Arabidopsis* plants	Chinnusamy *et al.* 2003
AtDREB1b	*Vitis vinifera*	*A. thaliana*	-4	Activity of *DREB1b* in transgenic grape significantly improves its resistance to cold stress	Jin *et al.* 2009