

**Supplemental Table S1:** List of selected genes of interest, their functions and involvements in biological processes.

<b>Abbreviation</b>	<b>Gene name</b>	<b>Molecular function</b>	<b>Involvement in biological processes</b>	<b>First publication</b>
<b>ABA2</b>	<i>ABA DEFICIENT 2</i>	Alcohol dehydrogenase (NAD <sup>+</sup> ) activity, identical protein binding, xanthoxin dehydrogenase activity	Abscisic acid biosynthetic process, proline biosynthetic process, regulation of abscisic acid biosynthetic process, response to fructose, response to heat, response to water deprivation, sugar mediated signaling pathway	Léon-Kloosterziel et al., 1996
<b>ABI3</b>	<i>ABA INSENSITIVE 3</i>	DNA binding, sequence-specific DNA binding	Embryo development ending in seed dormancy, mitochondria-nucleus signaling pathway, plastid organization, positive regulation of transcription, response to abscisic acid, response to auxin	Wehmeyer et al., 1996
<b>ABI4</b>	<i>ABA INSENSITIVE 4</i>	DNA binding, sequence-specific DNA binding	Abscisic acid-activated signaling pathway, hexokinase-dependent signaling, lateral root development, mitochondria-nucleus signaling pathway, positive regulation of transcription, regulation of L-ascorbic acid biosynthetic process, regulation of protein localization, regulation of stomatal movement, regulation of transcription, regulation of triglyceride catabolic process, response to glucose, response to osmotic stress, response to stress, response to sucrose, response to trehalose, response to water deprivation, root meristem growth, seed development, starch catabolic process, sugar mediated signaling pathway	Finkelstein, 1994
<b>ABI5</b>	<i>ABA INSENSITIVE 5</i>	DNA binding, protein binding, transcription regulatory region sequence-specific DNA binding	Negative regulation of seed germination, positive regulation of transcription, DNA-templated, response to abscisic acid, response to chitin, response to gibberellin, response to salt stress, response to water deprivation, seed development, seed germination, sugar mediated signaling pathway	Laby et al., 2000
<b>ACO</b>	<i>ETHYLENE FORMING ENZYME</i>	1-Amino-cyclopropane-1-carboxylate oxidase activity, dioxygenase activity	Cellular response to fatty acid, ethylene biosynthetic process, oxidation-reduction process, response to fungus	Gómez-Lim, 1993
<b>ACS</b>	<i>1-AMINO-CYCLOPROPAN E-1-CARBOXYLATE SYNTHASE</i>	1-Amino-cyclopropane-1-carboxylate synthase activity, protein binding, pyridoxal phosphate binding	1-Aminocyclopropane-1-carboxylate biosynthetic process, ethylene biosynthetic process	Schellingen et al., 2014

<b>AHK2</b>	<i>HISTIDINE KINASE 2</i>	Cytokinin receptor activity	Cellular response to abscisic acid stimulus, cellular response to cold, cytokinin-activated signaling pathway, negative regulation of iron iron transport, phloem or xylem histogenesis, phosphorelay signal transduction system, regulation of chlorophyll catabolic process, regulation of flower development, regulation of meristem development, regulation of seed germination, regulation of shoot system development, response to abscisic acid, response to osmotic stress, response to salt stress, response to toxic substance, response to water deprivation, secondary growth	Suzuki et al., 2001
<b>AHK3</b>	<i>HISTIDINE KINASE 3</i>	Cytokinin receptor activity	Cellular response to abscisic acid stimulus, cellular response to cold, cellular response to phosphate starvation, cellular response to sucrose stimulus, cytokinin-activated signaling pathway, defense response to bacterium, leaf senescence, negative regulation of iron ion transport, nucleoside metabolic process, phloem or xylem histogenesis, phosphorelay signal transduction system, regulation of chlorophyll catabolic process, regulation of flower development, regulation of meristem development, regulation of seed germination, regulation of shoot system development, response to cold, response to osmotic stress, response to salt stress, response to water deprivation, secondary growth	Yamada et al., 2001
<b>AHK4</b>	<i>HISTIDINE KINASE 4</i>	Cytokinin receptor activity	Carbohydrate homeostasis, cellular response to phosphate starvation, cellular response to sucrose stimulus, cytokinin-activated signaling pathway, defense response to bacterium, embryonic root morphogenesis, nucleoside metabolic process, osmosensory signaling pathway, phosphorelay signal transduction system, protein phosphorylation, regulation of meristem development, regulation of seed germination, regulation of shoot system development, response to water deprivation, sulfate transport	Scheres et al., 1995
<b>AHP2</b>	<i>HISTIDINE-CONTAINING PHOSPHOTRANSMITTER 2</i>	Protein binding	Antipodal cell differentiation, cytokinin-activated signaling pathway, embryo sac egg cell differentiation, phosphorelay signal transduction system, phosphorylation, regulation of cytokinin-activated signaling pathway, signal transduction	Suzuki et al., 1998

<b>AHP3</b>	<i>HISTIDINE-CONTAINING PHOSPHO-TRANSMITTER 3</i>	Histidine phosphotransfer kinase activity, protein binding, protein histidine kinase binding	Antipodal cell differentiation, cytokinin-activated signaling pathway, embryo sac egg cell differentiation, phosphorelay signal transduction system, phosphorylation, regulation of cytokinin-activated signaling pathway, signal transduction	Suzuki et al., 2000
<b>AHP5</b>	<i>HISTIDINE-CONTAINING PHOSPHO-TRANSMITTER 5</i>	Histidine phosphotransfer kinase activity, protein binding, protein histidine kinase binding	Antipodal cell differentiation, cytokinin-activated signaling pathway, embryo sac egg cell differentiation, phosphorelay signal transduction system, phosphorylation, regulation of cytokinin-activated signaling pathway, signal transduction	Miyata et al., 1998
<b>AOS</b>	<i>ALLENE OXIDE SYNTHASE</i>	Oxygen binding	Defense response, defense response to fungus, epoxygenase P450 pathway, jasmonic acid biosynthetic process, oxidation-reduction process, oxylipin biosynthetic process, oxylipin metabolic process, response to fungus, response to jasmonic acid, response to wounding, sterol metabolic process	Song et al., 1993
<b>APX1</b>	<i>ASCORBATE PEROXIDASE 1,</i>	p-Coumarate 3-hydroxylase activity	Cellular response to oxidative stress, embryo development ending in seed dormancy, hydrogen peroxide catabolic process, lignin biosynthetic process, phenylpropanoid biosynthetic process, response to cadmium ion, response to heat, response to oxidative stress	Kubo et al. 1993
<b>APX2</b>	<i>ASCORBATE PEROXIDASE 1,</i>	L-ascorbate peroxidase activity, heme binding, peroxidase activity	Cellular response to oxidative stress, hydrogen peroxide catabolic process, response to oxidative stress, response to reactive oxygen species	Hikaru et al., 1990
<b>ARF7</b>	<i>AUXIN RESPONSE FACTOR 7</i>	DNA binding	Blue light signaling pathway, gravitropism, lateral root development, lateral root formation, leaf development, phototropism, positive regulation of transcription, DNA-templated, regulation of growth, response to auxin, response to ethylene	Liscum E and Briggs, 1995
<b>ARF19</b>	<i>AUXIN RESPONSE FACTOR 19</i>	DNA binding, sequence-specific	Lateral root development, lateral root formation, leaf development, regulation of transcription, DNA-templated, response to auxin, response to ethylene	Riechmann et al., 2000

<b>ARR12</b>	<i>RESPONSE REGULATOR 12</i>	DNA-binding transcription factor activity, phosphorelay response regulator activity	Cellular response to cytokinin stimulus, cytokinin-activated signaling pathway, maintenance of shoot apical meristem identity, primary root development, regulation of anthocyanin metabolic process, regulation of chlorophyll biosynthetic process, regulation of cytokinin-activated signaling pathway, regulation of root meristem growth, regulation of seed growth, response to cytokinin, response to water deprivation, root development, shoot system development	Riechmann et al., 2001
<b>ARX2/ IAA7</b>	<i>AUXIN RESISTANT 2/ INDOLE-3- ACETIC ACID 7</i>	Transcription regulatory region sequence-specific DNA binding	Gravitropism, regulation of transcription, DNA-templated, response to auxin, response to jasmonic acid, response to water deprivation, response to wounding	Wilson et al., 1990
<b>BAK1</b>	<i>BRI1- ASSOCIATED RECEPTOR KINASE</i>	Protein binding	Brassinosteroid mediated signaling pathway, cell death, defense response to bacterium, defense response to fungus, defense response to oomycetes, protein phosphorylation	Halliday et al., 1996
<b>BIN2</b>	<i>BRASSINOSTER OID- INSENSITIVE 2</i>	Protein binding	Brassinosteroid mediated signaling pathway, detection of brassinosteroid stimulus, leaf morphogenesis, multidimensional cell growth, negative regulation of brassinosteroid mediated signaling pathway, positive regulation of protein export from nucleus, protein autophosphorylation, protein phosphorylation, response to auxin, root hair cell differentiation, signal transduction	Li et al., 2001
<b>BHLH</b>	<i>BASIC HELIX- LOOP-HELIX</i>	DNA-binding transcription factor activity, RNA polymerase II-specific, transcription regulatory region sequence-specific DNA binding, protein dimerization activity	Regulation of transcription by RNA polymerase II, regulation of transcription, DNA-templated	Riechmann et al., 2000

<b>BRI1</b>	<i>BRASSINOSTEROID OID INSENSITIVE 1</i>	Protein binding, steroid binding	Anther wall tapetum cell differentiation, brassinosteroid homeostasis, brassinosteroid mediated signaling pathway, detection of brassinosteroid stimulus, hormone-mediated signaling pathway, leaf development, negative regulation of cell death, pollen exine formation, positive regulation of flower development, regulation of seedling development, response to UV-B, unidimensional cell growth	Li et al., 2002
<b>BZIP3</b>	<i>BASIC LEUCINE- ZIPPER 3</i>	DNA-binding transcription factor activity	Regulation of transcription, DNA-templated	Riechmann et al., 2000
<b>BZR1</b>	<i>BRASSINAZOLE -RESISTANT 1</i>	DNA-binding, protein binding	Brassinosteroid mediated signaling pathway, negative regulation of transcription, plant ovule development, regulation of transcription, DNA-templated, seed development, transcription	Zhao et al., 2002
<b>CAB</b>	<i>CHLOROPHYLL A/B BINDING PROTEIN</i>	Chlorophyll binding, mRNA binding	Photosynthesis, light harvesting in photosystem I, response to light stimulus	Karlin- Neumann et al., 1988
<b>CDPK6</b>	<i>CALCIUM- DEPENDENT PROTEIN KINASE 6</i>	Calcium ion binding, calcium-dependent protein serine/threonine kinase activity, calmodulin binding, calmodulin- dependent protein kinase activity, protein binding, protein kinase activity, protein serine kinase activity, protein serine/threonine kinase activity, protein threonine kinase activity	Abscisic acid-activated signaling pathway, intracellular signal transduction, peptidyl- serine phosphorylation, protein autophosphorylation, regulation of anion channel activity, regulation of stomatal movement, response to salt stress	Douglas et al. 1998

<b>COI1</b>	<i>CORONATINE INSENSITIVE 1</i>	Protein binding	SCF-dependent proteasomal ubiquitin-dependent protein catabolic process, anther dehiscence, defense response, defense response to bacterium, defense response to fungus, extracellular ATP signaling, jasmonic acid and ethylene-dependent systemic resistance, jasmonic acid mediated signaling pathway, negative regulation of defense response, protein ubiquitination, regulation of flower development, response to far red light, response to insect, response to jasmonic acid, response to wounding, root development, shade avoidance, stamen development, stomatal movement, ubiquitin-dependent protein catabolic process	Feys et al., 1994
<b>COP1</b>	<i>CONSTITUTIVE PHOTOMORPHOGENIC 1</i>	Protein binding	DNA repair, anthocyanin-containing compound metabolic process, entrainment of circadian clock, photomorphogenesis, photoperiodism, flowering, protein ubiquitination, regulation of stomatal movement, shade avoidance, skotomorphogenesis	Deng et al., 1991
<b>CPD</b>	<i>CONSTITUTIVE PHOTOMORPHOGENIC DWARF</i>	Heme binding, iron ion binding, monooxygenase activity, oxidoreductase activity, acting on paired donors, with incorporation or reduction of molecular oxygen, protein binding	Anther wall tapetum cell differentiation, brassinosteroid biosynthetic process, brassinosteroid homeostasis, multicellular organism development, oxidation-reduction process, pollen exine formation, positive regulation of flower development, response to UV	Gendron et al., 2008
<b>DGDG</b>	<i>DIGALACTOSYL DIACYLGLYCEROL DEFICIENT</i>	UDP-galactosyltransferase activity, digalactosyl diacylglycerol synthase activity, transferase activity, transferring glycosyl groups	Cellular response to phosphate starvation, galactolipid biosynthetic process, glycolipid biosynthetic process	Härtel et al. 2000
<b>EIN3</b>	<i>ETHYLENE-INSENSITIVE3</i>	DNA binding, protein binding	Defense response to bacterium, ethylene-activated signaling pathway, regulation of L-ascorbic acid biosynthetic process, regulation of transcription, DNA-templated, response to ethylene, response to hypoxia, sugar mediated signaling pathway	Roman et al., 1995

<b>EIN2</b>	<i>ETHYLENE INSENSITIVE 2</i>	mRNA binding, protein binding	Auxin polar transport, cell death, cell division, defense response by callose deposition in cell wall, defense response to bacterium, defense response to fungus, establishment of planar polarity, ethylene-activated signaling pathway, extracellular ATP signaling, jasmonic acid and ethylene-dependent systemic resistance, ethylene mediated signaling pathway, leaf senescence, negative regulation of defense response, phloem or xylem histogenesis, positive regulation of abscisic acid-activated signaling pathway, regulation of stomatal movement, response to ethylene, response to heat, response to hormone, response to jasmonic acid, response to molecule of bacterial origin, response to osmotic stress, response to oxidative stress, response to salt stress, root hair cell differentiation, sugar mediated signaling pathway	Alonso et al., 1999
<b>EIN3</b>	<i>ETHYLENE-INSENSITIVE3</i>	DNA binding, protein binding	Defense response to bacterium, ethylene-activated signaling pathway, regulation of L-ascorbic acid biosynthetic process, regulation of transcription, DNA-templated, response to ethylene, response to hypoxia, sugar mediated signaling pathway	Roman et al., 1995
<b>EIL1</b>	<i>ETHYLENE-INSENSITIVE3-LIKE 1</i>	Protein binding	Defense response to bacterium, ethylene-activated signaling pathway, response to ethylene	Chao et al., 1997
<b>ETR1</b>	<i>ETHYLENE RESPONSE 1</i>	Ethylene binding	Cell division, cytokinin metabolic process, defense response, defense response by callose deposition in cell wall, defense response to bacterium, detection of ethylene stimulus, hydrogen peroxide biosynthetic process, jasmonic acid and ethylene-dependent systemic resistance, ethylene mediated signaling pathway, negative regulation of ethylene-activated signaling pathway, phloem or xylem histogenesis, regulation of seedling development, regulation of stomatal movement, response to abscisic acid, response to auxin, response to ethylene, response to gibberellin, response to heat, response to insect, response to molecule of bacterial origin, response to salt stress, seed dormancy process, sugar mediated signaling pathway	Asai et al., 2000

<b>FIN219/ JAR1</b>	<i>FAR-RED INSENSITIVE 219/ JASMONATE RESISTANT 1</i>	ATP binding, acid-amino acid ligase activity, adenyltransferase activity, amino acid binding, catalytic activity, enzyme binding, jasmonate-amino synthetase activity, leucine binding, protein binding	Cellular response to auxin stimulus, induced systemic resistance, jasmonic acid mediated signaling pathway, jasmonic acid and ethylene-dependent systemic resistance, jasmonic acid metabolic process, negative regulation of defense response, photomorphogenesis, protein adenylation, red, far-red light phototransduction, regulation of reactive oxygen species metabolic process, regulation of response to red or far red light, regulation of stomatal movement, response to UV-B, response to jasmonic acid, response to mycotoxin, response to ozone, response to wounding, systemic acquired resistance	Staswick et al., 1992
<b>GA2OX2</b>	<i>GIBBERELLIN 2-OXIDASE 2</i>	C-19 gibberellin 2-beta-dioxygenase activity, dioxygenase activity	Cellular response to hypoxia, gibberellin biosynthetic process, gibberellin catabolic process, response to light stimulus, response to red light, response to red or far red light	Thomas et al., 1999
<b>GLK2</b>	<i>GOLDEN2- LIKE2</i>	DNA-binding transcription factor activity, protein binding, transcription regulatory region sequence-specific DNA binding	Chloroplast organization, negative regulation of flower development, negative regulation of leaf senescence, positive regulation of transcription, DNA-templated, regulation of chlorophyll biosynthetic process, signal transduction	Waters et al., 2008
<b>GDC</b>	<i>GLYCINE DECARBOXYLA SE COMPLEX</i>	glycine dehydrogenase (decarboxylating) activity	Glycine decarboxylation via glycine cleavage system, photorespiration, protein lipoylation	Srinivasan and Oliver (1995)
<b>GK</b>	<i>GLYCERATE KINASE</i>	ATP binding, glycerate kinase activity, kinase activity	Oxidative photosynthetic carbon pathway, photorespiration	Haas et al., 2002
<b>GO</b>	<i>GLYCOLATE OXIDASE</i>	mRNA binding	Defense response to bacterium, hydrogen peroxide biosynthetic process, oxidative photosynthetic carbon pathway	Ma et al., 2002



<b>GNC</b>	<i>GATA, NITRATE-INDUCIBLE, CARBON METABOLISM-INVOLVED</i>	DNA-binding transcription factor activity, protein binding, sequence-specific DNA binding, zinc ion binding	Chloroplast elongation, chloroplast organization, circadian rhythm, cytokinin-activated signaling pathway, gibberellic acid mediated signaling pathway, glucose mediated signaling pathway, negative regulation of flower development, negative regulation of gibberellic acid mediated signaling pathway, negative regulation of seed germination, plant organ senescence, positive regulation of chlorophyll biosynthetic process, regulation of carbohydrate utilization, regulation of chlorophyll biosynthetic process, regulation of gene expression, regulation of nitrogen compound metabolic process, regulation of photoperiodism, flowering, regulation of seed development, regulation of seed germination, response to auxin, response to cytokinin, response to gibberellin, response to light stimulus	Sánchez et al., 2004
<b>GNL</b>	<i>GNC-LIKE</i>	DNA-binding transcription factor activity, protein binding, sequence-specific DNA binding, zinc ion binding	Chloroplast elongation, chloroplast organization, circadian rhythm, cytokinin-activated signaling pathway, gibberellic acid mediated signaling pathway, negative regulation of flower development, negative regulation of gibberellic acid mediated signaling pathway, negative regulation of seed germination, plant organ senescence, positive regulation of chlorophyll biosynthetic process, regulation of carbohydrate utilization, regulation of chlorophyll biosynthetic process, regulation of gene expression, regulation of photoperiodism, flowering, regulation of seed development, regulation of seed germination, regulation of transcription, DNA-templated, response to auxin, response to cytokinin, response to gibberellin, response to light stimulus, response to nitrate, response to red light	Nemhauser et al., 2006
<b>HYS</b>	<i>ELONGATED HYPOCOTYL 5</i>	DNA binding, double-stranded DNA binding	Gibberellic acid mediated signaling pathway, photomorphogenesis, positive gravitropism, positive regulation of anthocyanin metabolic process, positive regulation of circadian rhythm, red or far-red light signaling pathway, regulation of abscisic acid-activated signaling pathway, regulation of photomorphogenesis, regulation of transcription, DNA-templated, response to UV-B, response to abscisic acid, response to far red light, response to karrikin, response to red light	Somers et al., 1991

<b>IAA14/ SLR</b>	<i>INDOLE-3-ACETIC ACID INDUCIBLE 14/ SOLITARY ROOT</i>	DNA-binding transcription factor activity, protein binding	Lateral root morphogenesis, negative regulation of transcription, DNA-templated, regulation of transcription, DNA-templated, response to auxin	Abel et al., 1995
<b>IPT</b>	<i>ISOPENTENYL-TRANSFERASE</i>	ADP dimethylallyl-transferase activity, AMP dimethylallyl-transferase activity,	Cytokinin biosynthetic process, pollen tube growth, tRNA modification	Takei et al., 2003
<b>JAZ9</b>	<i>JASMONATE-ZIM-DOMAIN PROTEIN 9</i>	Protein binding	Regulation of defense response, regulation of jasmonic acid mediated signaling pathway, response to jasmonic acid, response to wounding	Vanholme et al. 2007
<b>LHCB</b>	<i>LIGHT HARVESTING COMPLEX PHOTOSYSTEM II</i>	Chlorophyll binding, mRNA binding	Nonphotochemical quenching, photosynthesis, photosynthesis, light harvesting in photosystem I, response to light stimulus	Jansson, 1999
<b>MAX2</b>	<i>MORE AXILLARY BRANCHES 2</i>	Protein binding	SCF-dependent proteasomal ubiquitin-dependent protein catabolic process, aging, auxin polar transport, cuticle development, negative regulation of seed germination, positive regulation of response to water deprivation, protein ubiquitination, regulation of meristem structural organization, response to light stimulus, shoot system morphogenesis, ubiquitin-dependent protein catabolic process	Oh et al., 1997
<b>MYC2</b>	<i>JASMONATE INSENSITIVE 1</i>	DNA binding, protein binding, sequence-specific DNA binding	Extracellular ATP signaling, jasmonic acid mediated signaling pathway, positive regulation of flavonoid biosynthetic process, positive regulation of transcription, DNA-templated, protein homotetramerization, regulation of DNA-binding transcription factor activity, regulation of defense response to insect, regulation of secondary cell wall biogenesis, regulation of transcription from RNA polymerase II promoter in response to oxidative stress, regulation of transcription, DNA-templated, regulation of tryptophan metabolic process, response to abscisic acid, response to chitin, response to desiccation, response to jasmonic acid, response to wounding, stomatal complex development	Berger et al., 1996
<b>NCED2</b>	<i>NINE-CIS-EPOXY-CAROTENOID DIOXYGENASE 2</i>	9-Cis-epoxycarotenoid dioxygenase activity, carotenoid dioxygenase activity	Abscisic acid biosynthetic process, carotene catabolic process, oxidation-reduction process	Qin and Zeevaart, 1999
<b>NCED3</b>	<i>NINE-CIS-EPOXY-CAROTENOID</i>	9-Cis-epoxycarotenoid dioxygenase	9-Cis-epoxycarotenoid dioxygenase activity, carotenoid dioxygenase activity	Qin and Zeevaart, 1999

	<i>DIOXYGENASE 3</i>	activity, carotenoid dioxygenase activity		
<b>NCED4</b>	<i>NINE-CIS-EPOXY-CAROTENOID DIOXYGENASE 4</i>	Carotenoid dioxygenase activity, protein binding	Carotene catabolic process	Kim and von Arnim, 2006
<b>NCED5</b>	<i>NINE-CIS-EPOXY-CAROTENOID DIOXYGENASE 9</i>	9-Cis-epoxycarotenoid dioxygenase activity, carotenoid dioxygenase activity	Abscisic acid biosynthetic process, carotene catabolic process, response to water deprivation, seed dormancy process	Qin and Zeevaart, 1999
<b>NCED9</b>	<i>NINE-CIS-EPOXY-CAROTENOID DIOXYGENASE 6</i>	9-Cis-epoxycarotenoid dioxygenase activity, carotenoid dioxygenase activity	Abscisic acid biosynthetic process, carotene catabolic process, seed dormancy process	Qin and Zeevaart, 1999
<b>PORA</b>	<i>PROTOCHLOROPHYLLIDE OXIDOREDUCTASE A</i>	mRNA binding	Chlorophyll biosynthetic process, photomorphogenesis, response to ethylene, skotomorphogenesis	Armstrong et al., 1995
<b>PORB</b>	<i>PROTOCHLOROPHYLLIDE OXIDOREDUCTASE B</i>	mRNA binding	Chlorophyll biosynthetic process, response to ethylene	Benli et al., 1991
<b>PSBD</b>	<i>PHOTOSYSTEM II REACTION CENTER PROTEIN D</i>	mRNA binding	Photosynthesis, light harvesting in photosystem II, photosynthetic electron transport in photosystem II	Christopher and Hoffer, 1998
<b>PSBQ</b>	<i>PHOTOSYSTEM II SUBUNIT Q</i>	Calcium ion binding, electron transporter, transferring electrons within the cyclic electron transport pathway of photosynthesis activity	Photosynthetic electron transport chain	Schubert et al. (2002)
<b>PYL9/RCAR1</b>	<i>PYRABACTIN RESISTANCE 1-LIKE 9/REGULATORY COMPONENT OF ABA RECEPTOR 1</i>	Abscisic acid binding, protein binding, protein homodimerization activity, protein phosphatase inhibitor activity, signaling receptor activity	Abscisic acid-activated signaling pathway, regulation of protein serine/threonine phosphatase activity	Nishimura et al., 2010
<b>RBCS</b>	<i>RIBULOSE BISPHTHAT E CARBOXYLASE SMALL</i>	Copper ion binding, mRNA binding	Photosynthesis, carbon fixation, response to cold, ribulose bisphosphate carboxylase complex assembly	Schubert et al. (2002)
<b>RBCL</b>	<i>RIBULOSE BISPHTHAT E CARBOXYLASE LARGE</i>	mRNA binding	Photosynthesis, carbon fixation, response to abscisic acid, response to cadmium ion	Nuget and Palmer, 1988

<b>SAG101</b>	<i>SENESCENCE-ASSOCIATED GENE 101</i>	Carboxylic ester hydrolase activity, methyl indole-3-acetate esterase activity, protein binding	Aging, defense response to Gram-negative bacterium, leaf abscission, lipid metabolic process, positive regulation of defense response to bacterium, positive regulation of defense response to oomycetes, positive regulation of defense response to virus by host, positive regulation of leaf senescence	Kim et al., 2008
<b>SAG102</b>	<i>SENESCENCE-ASSOCIATED GENE 102</i>	Kinase binding, protein binding	Response to abscisic acid, response to glucose, response to mannose, response to sucrose, seed dormancy process	Dal Bosco et al., 2004
<b>SHMT</b>	<i>SERINE HYDROXY-METHYLTRANSFERASE</i>	mRNA binding, poly(U) RNA binding	L-serine catabolic process, L-serine metabolic process, circadian rhythm, folic acid metabolic process, glycine biosynthetic process from serine, glycine decarboxylation via glycine cleavage system, glycine metabolic process, one-carbon metabolic process, photorespiration, plant-type hypersensitive response, response to cadmium ion, response to cold, response to light stimulus, tetrahydrofolate interconversion, tetrahydrofolate metabolic process	Chastain, 1985
<b>SIG2</b>	<i>SIGMA FACTOR 2</i>	DNA-binding transcription factor activity, sigma factor activity	DNA-binding transcription factor activity, cellular response to light stimulus, chloroplast organization, regulation of RNA biosynthetic process, response to blue light, response to red light, tRNA metabolic process	Moroni et al., 2000
<b>SIG4</b>	<i>SIGMA FACTOR 4</i>	DNA-binding transcription factor activity, sigma factor activity	DNA-templated transcription, initiation, cellular response to light stimulus, regulation of RNA biosynthetic process	Fujiwara et al. 2000
<b>SIG5</b>	<i>SIGMA FACTOR 5</i>	DNA-binding transcription factor activity, sigma factor activity	DNA-templated transcription, initiation, cellular response to blue light, cellular response to salt stress, chloroplast organization, embryo sac development, photosystem II assembly, positive regulation of transcription, DNA-templated, regulation of RNA biosynthetic process, response to blue light, response to far red light, response to red light	Fujiwara et al. 2000
<b>SIG6</b>	<i>SIGMA FACTOR 6</i>	DNA-binding transcription factor activity, sigma factor activity	DNA-templated transcription, initiation, cellular response to blue light, cellular response to light stimulus, positive regulation of transcription, DNA-templated, seedling development	Fujiwara et al. 2000

<b>SNRK2/OST1</b>	<i>SNF1-RELATED PROTEIN KINASE 2/ OPEN STOMATA 1</i>	Calcium-dependent protein serine/threonine kinase activity, identical protein binding, kinase activity, protein binding, protein kinase activity, protein serine kinase activity, protein serine/threonine kinase activity, protein threonine kinase activity	Abscisic acid-activated signaling pathway, cellular response to absence of light, cellular response to carbon dioxide, defense response to bacterium, intracellular signal transduction, leaf development, positive regulation of abscisic acid-activated signaling pathway, protein autophosphorylation, protein phosphorylation, regulation of reactive oxygen species metabolic process, regulation of stomatal closure, regulation of stomatal movement, regulation of stomatal opening, response to abscisic acid, response to osmotic stress, response to salt stress, response to water deprivation, stomatal movement, sucrose metabolic process, triglyceride biosynthetic process, unsaturated fatty acid biosynthetic process	Merlot et al., 2002
<b>STOMAGEN</b>		Protein kinase binding	Cell-cell signaling, guard cell differentiation, positive regulation of stomatal complex development, regulation of stomatal complex development, stomatal complex development, stomatal complex patterning	Kondo et al., 2009
<b>VDE</b>	<i>VIOLAXANTHIN DE-EPOXIDASE</i>	Oxidoreductase activity, protein binding, violaxanthin de-epoxidase activity	Chlorophyll metabolic process, fatty acid metabolic process, response to heat, xanthophyll cycle, xanthophyll metabolic process	Bugos et al., 1998
<b>VTC</b>	<i>VITAMIN C DEFECTIVE</i>	Protein binding	GDP-mannose biosynthetic process, L-ascorbic acid biosynthetic process, cellulose biosynthetic process, defense response to bacterium, response to ammonium ion, response to heat, response to jasmonic acid, response to ozone, response to salt stress	Castle et al., 1993
<b>WRKY8</b>	<i>WRKY DNA-BINDING PROTEIN 8</i>	DNA-binding transcription factor activity, protein binding, sequence-specific DNA binding	Cellular response to hydrogen peroxide, defense response to bacterium, defense response to fungus, defense response to virus, positive regulation of response to salt stress, regulation of transcription, DNA-templated, response to abscisic acid	Eulgem et al., 2000
<b>WRKY18</b>	<i>WRKY DNA-BINDING PROTEIN 18</i>	Protein binding	Defense response to bacterium, defense response to fungus, regulation of defense response, regulation of defense response to virus by host, regulation of transcription, DNA-templated, response to chitin, response to molecule of bacterial origin, response to salicylic acid	Eulgem et al., 2000
<b>WRKY57</b>	<i>WRKY DNA-BINDING PROTEIN 57</i>	DNA-binding transcription factor activity, sequence-	Regulation of transcription, DNA-templated, response to osmotic stress, response to salt stress, response to water deprivation	Riechmann et al., 2000

		specific DNA binding		
<b>YUCCA</b>		N,N-dimethylaniline monooxygenase activity, NADP binding, flavin adenine dinucleotide binding, indole-3-pyruvate monooxygenase activity	Auxin biosynthetic process, cotyledon development, inflorescence development, phyllome development, positive regulation of flower development, regulation of anatomical structure morphogenesis, regulation of leaf development	Zhao et al., 2001

## LITERATURE CITED

- Abel S, Nguyen MD, Theologis A (1995) The PS-IAA4/5-like family of early auxin-inducible mRNAs in *Arabidopsis thaliana*. *J Mol Biol* **251**: 533-49
- Alonso JM, Hirayama T, Roman G, Nourizadeh S, Ecker JR (1999) EIN2, a bifunctional transducer of ethylene and stress responses in *Arabidopsis*. *Science* **284**: 2148-2152
- Armstrong GA, Runge S, Frick G, Sperling U, Apel K (1995) Identification of NADPH:protochlorophyllide oxidoreductases A and B: a branched pathway for light-dependent chlorophyll biosynthesis in *Arabidopsis thaliana*. *Plant Physiol.* **108**: 1505-1517
- Asai T, Stone JM, Heard JE, Kovtun Y, Yorgey P, Sheen J, Ausubel FM (2000) Fumonisin B1-induced cell death in *Arabidopsis* protoplasts requires jasmonate-, ethylene-, and salicylate-dependent signaling pathways. *Plant Cell* **12**: 1823-1836
- Benli M, Schulz R, Apel K (1991) Effect of light on the NADPH-protochlorophyllide oxidoreductase of *Arabidopsis thaliana*. *Plant Mol Biol* **16**: 615-625
- Berger S, Bell E, Mullet JE (1996) Two methyl jasmonate-insensitive mutants show altered expression of AtVsp in response to methyl jasmonate and wounding. *Plant Physiol* **111**: 525-531
- Bugos RC, Hieber AD, Yamamoto HY (1998) Xanthophyll cycle enzymes are members of the lipocalin family, the first identified from plants. *J Biol Chem* **273**: 15321-15324
- Chastain CJ (1985) Photosynthesis inhibition in the *Arabidopsis thaliana* photorespiration mutants. DAI 46, section B: 2153
- Castle LA, Errampalli D, Atherton TL, Franzmann LH, Yoon ES, Meinke DW (1993) Genetic and molecular characterization of embryonic mutants identified following seed transformation in *Arabidopsis*. *Mol Gen Genet* **241**: 504-514.
- Chao Q, Rothenberg M, Solano R, Roman G, Terzaghi W, Ecker JR (1997) Activation of the ethylene gas response pathway in *Arabidopsis* by the nuclear protein ETHYLENE-INSENSITIVE3 and related proteins. *Cell* **8**: 1133-44
- Christopher DA, Hoffer PH (1998) DET1 represses a chloroplast blue light-responsive promoter in a developmental and tissue-specific manner in *Arabidopsis thaliana*. *Plant J.* **14**: 1-11
- Dal Bosco C, Lezhneva L, Biehl A, Leister D, Strotmann H, Wanner G, Meurer J (2004) Inactivation of the chloroplast ATP synthase gamma subunit results in high non-photochemical fluorescence quenching and altered nuclear gene expression in *Arabidopsis thaliana*. *J Biol Chem* **279**: 1060-1069

- Deng XW, Caspar T, Quail PH (1991) *cop1*: a regulatory locus involved in light-controlled development and gene expression in *Arabidopsis*. *Genes Dev* **5**: 1172-1182
- Douglas P, Moorhead G, Hong Y, Morrice N, MacKintosh C (1998) Purification of a nitrate reductase kinase from *Spinacea oleracea* leaves, and its identification as a calmodulin-domain protein kinase. *Planta* **206**: 435-442
- Eulgem T, Rushton PJ, Robatzek S, Somssich IE (2000) The WRKY superfamily of plant transcription factors. *Trends Plant Sci* **5**: 199-206
- Feys B, Benedetti CE, Penfold CN, Turner JG (1994) *Arabidopsis* Mutants Selected for Resistance to the Phytotoxin Coronatine Are Male Sterile, Insensitive to Methyl Jasmonate, and Resistant to a Bacterial Pathogen. *Plant Cell* **6**: 751-759
- Finkelstein RR (1994) Mutations at two new *Arabidopsis* ABA response loci are similar to the *abi3* mutations. *Plant J* **5**: 765-771
- Fujiwara M, Nagashima A, Kanamaru K, Tanaka K, Takahashi H (2000) Three new nuclear genes, *sigD*, *sigE* and *sigF*, encoding putative plastid RNA polymerase sigma factors in *Aarabidopsis thaliana*. *FEBS Lett* **481**: 47-52
- Gendron JM, Haque A, Gendron N, Chang T, Asami T, Wang ZY (2008) Chemical genetic dissection of brassinosteroid-ethylene interaction. *Mol Plant* **1**: 368-379
- Gómez-Lim MA, Valdés-López V, Cruz-Hernandez A, Saucedo-Arias LJ (1993) Isolation and characterization of a gene involved in ethylene biosynthesis from *Arabidopsis thaliana*. *Gene* **134**: 217-221
- Halliday K, Devlin PF, Whitelam GC, Hanhart C, Koornneef M (1996) The ELONGATED gene of *Arabidopsis* acts independently of light and gibberellins in the control of elongation growth. *Plant J* **9**: 305-312
- Härtel H, Dormann P, Benning C (2000) DGD1-independent biosynthesis of extraplastidic galactolipids after phosphate deprivation in *Arabidopsis*. *Proc Natl Acad Sci U S A* **97**: 10649-10654
- Haas BJ, Volfovsky N, Town CD, Troukhan M, Alexandrov N, Feldmann KA, Flavell RB, White O, Salzberg SL (2002) Full-length messenger RNA sequences greatly improve genome annotation. *Genome Biol* **3**: RESEARCH0029
- Hikaru S, Tanaka K, Kondo N (1990) Monoclonal Antibodies to Spinach Ascorbate Peroxidase and Immunochemical Detection of the Enzyme in Eight Different Plant Species. *Plant Sci* **69**: 1-9
- Jansson S (1999) A guide to the Lhc genes and their relatives in *Arabidopsis*/IT. *Trends Plant Sci* **4**: 236-240
- Karlin-Neumann GA, Sun L, Tobin EM (1988) Expression of light-harvesting chlorophyll *a/b*-protein genes is phytochrome-regulated in etiolated *Arabidopsis thaliana* seedlings. *Plant Physiol* **88**: 1323-1331
- Kim BH, von Arnim AG (2006) The early dark-response in *Arabidopsis thaliana* revealed by cDNA microarray analysis. *Plant Mol Biol* **60**: 321-342
- Kim CY, Bove J, Assmann SM (2008) Overexpression of wound-responsive RNA-binding proteins induces leaf senescence and hypersensitive-like cell death. *New Phytol* **180**: 57-70
- Kondo T, Kajita R, Miyazaki A, Hokoyama M, Nakamura-Miura T, Mizuno S, Masuda Y, Irie K, Tanaka Y, Takada S, Kakimoto T, Sakagami Y (2010) Stomatal density is controlled by a mesophyll-derived signaling molecule. *Plant Cell Physiol* **51**: 1-8
- Kubo A, Saji H, Tanaka K, Kondo N (1993) Genomic DNA structure of a gene encoding cytosolic ascorbate peroxidase from *Arabidopsis thaliana*. *FEBS Lett.* **315**: 313-317
- Laby RJ, Kincaid MS, Kim D, Gibson SI (2000) The *Arabidopsis* sugar-insensitive mutants *sis4* and *sis5* are defective in abscisic acid synthesis and response. *Plant J* **23**: 587-596
- Léon-Kloosterziel KM, Gil MA, Ruijs GJ, Jacobsen SE, Olszewski NE, Schwartz SH, Zeevaart JA, Koornneef M (1996) Isolation and characterization of abscisic acid-deficient *Arabidopsis* mutants at two new loci. *Plant J* **10**: 655-661
- Li J, Nam KH, Vafeados D, Chory J (2001) BIN2, a new brassinosteroid-insensitive locus in *Arabidopsis*. *Plant Physiol* **127**: 14-22

- Li J, Wen J, Lease KA, Doke JT, Tax FE, Walker JC (2002) BAK1, an Arabidopsis LRR receptor-like protein kinase, interacts with BRI1 and modulates brassinosteroid signaling. *Cell* **110**: 213-222
- Liscum E, Briggs WR (1995) Mutations in the NPH1 locus of Arabidopsis disrupt the perception of phototropic stimuli. *Plant Cell* **7**: 473-485
- Ma L, Gao Y, Qu L, Chen Z, Li J, Zhao H, Deng XW (2002) Genomic evidence for COP1 as a repressor of light-regulated gene expression and development in Arabidopsis. *Plant Cell* **14**: 2383-2398
- Merlot S, Mustilli AC, Genty B, North H, Lefebvre V, Sotta B, Vavasseur A, Giraudat J (2002) Use of infrared thermal imaging to isolate Arabidopsis mutants defective in stomatal regulation. *Plant J* **30**: 601-609
- Miyata S, Urao T, Yamaguchi-Shinozaki K, Shinozaki K (1998) Characterization of genes for two-component phosphorelay mediators with a single HPT domain in *Arabidopsis thaliana*. *FEBS Lett* **437**: 11-14
- Moroni A, Gazzarrini S, Cerana R, Colombo R, Sutter JU, DiFrancesco D, Gradmann D, Thiel G (2000) Mutation in pore domain uncovers cation- and voltage-sensitive recovery from inactivation in KAT1 channel. *Biophys J* **78**:1862-1871
- Nemhauser JL, Hong F, Chory J (2006) Different plant hormones regulate similar processes through largely nonoverlapping transcriptional responses. *Cell* **126**: 467-475
- Nishimura N, Sarkeshik A, Nito K, Park SY, Wang A, Carvalho PC, Lee S, Caddell DF, Cutler SR, Chory J, Yates JR, Schroeder JI (2010) PYR/PYL/RCAR family members are major in-vivo ABI1 protein phosphatase 2C-interacting proteins in Arabidopsis. *Plant J* **61**: 290-299
- Nugent JM, Palmer JD (1988) Location, identity, amount and serial entry of chloroplast DNA sequences in crucifer mitochondrial DNAs. *Curr Genet* **14**: 501-509
- Oh SA, Park JH, Lee GI, Paek KH, Park SK, Nam HG (1997) Identification of three genetic loci controlling leaf senescence in *Arabidopsis thaliana*. *Plant J* **12**: 527-535
- Qin X, Zeevaart JA (1999) The 9-cis-epoxycarotenoid cleavage reaction is the key regulatory step of abscisic acid biosynthesis in water-stressed bean. *Proc Natl Acad Sci U S A* **96**: 15354-15361
- Riechmann JL, Heard J, Martin G, Reuber L, Jiang C, Keddie J, Adam L, Pineda O, Ratcliffe OJ, Samaha RR, Creelman R, Pilgrim M, Broun P, Zhang JZ, Ghandehari D, Sherman BK, Yu G (2000) Arabidopsis transcription factors: genome-wide comparative analysis among eukaryotes. *Science* **290**: 2105-2110
- Roman G, Lubarsky B, Kieber JJ, Rothenberg M, Ecker JR (1995) Genetic analysis of ethylene signal transduction in *Arabidopsis thaliana*: five novel mutant loci integrated into a stress response pathway. *Genetics* **139**: 1393-1409
- Sánchez JP, Duque P, Chua NH (2004) ABA activates ADPR cyclase and cADPR induces a subset of ABA-responsive genes in Arabidopsis. *Plant J* **38**: 381-395
- Schellingen K, Van Der Straeten D, Vandebussche F, Prinsen E, Remans T, Vangronsveld J, Cuypers A (2014) Cadmium-induced ethylene production and responses in *Arabidopsis thaliana* rely on ACS2 and ACS6 gene expression. *BMC Plant Biol* **14**: 214
- Scheres B, Di Laurenzio L, Willemsen V, Hauser M T, Janmaat K, Weisbeek P, Benfey PN (1995) Mutations affecting the radial organisation of the Arabidopsis root display specific defects throughout the embryonic axis. *Development* **121**: 5
- Schubert M, Petersson UA, Haas BJ, Funk C, Schröder WP, Kieselbach T (2002) Proteome map of the chloroplast lumen of *Arabidopsis thaliana*. *J Biol Chem* **277**: 8354-8365
- Srinivasan R, Oliver DJ (1995) Light-dependent and tissue-specific expression of the H-protein of the glycine decarboxylase complex. *Plant Physiol* **109**: 161-168
- Somers DE, Sharrock RA, Tepperman JM, Quail PH (1991) The hy3 Long Hypocotyl Mutant of Arabidopsis Is Deficient in Phytochrome B. *Plant Cell* **3**: 1263-1274



- Song WC, Funk CD, Brash AR (1993) Molecular cloning of an allene oxide synthase: a cytochrome P450 specialized for the metabolism of fatty acid hydroperoxides. *Proc Natl Acad Sci U S A* **90**: 8519-8523
- Staswick PE, Su W, Howell SH (1992) Methyl jasmonate inhibition of root growth and induction of a leaf protein are decreased in an *Arabidopsis thaliana* mutant. *Proc Natl Acad Sci U S A* **89**: 6837-6840
- Suzuki T, Imamura A, Ueguchi C, Mizuno T (1998) Histidine-containing phosphotransfer (HPT) signal transducers implicated in His-to-Asp phosphorelay in Arabidopsis. *Plant Cell Physiol* **39**: 1258-1268
- Suzuki T, Miwa K, Ishikawa K, Yamada H, Aiba H, Mizuno T (2001) The Arabidopsis sensor His-kinase, AHk4, can respond to cytokinins. *Plant Cell Physiol* **42**: 107-113
- Suzuki T, Sakurai K, Imamura A, Nakamura A, Ueguchi C, Mizuno T (2000) Compilation and characterization of histidine-containing phosphotransmitters implicated in His-to-Asp phosphorelay in plants: AHP signal transducers of *Arabidopsis thaliana*. *Biosci Biotechnol Biochem* **64**: 2486-2489
- Takei K, Dekishima Y, Eguchi T, Yamaya T, Sakakibara H (2003) A new method for enzymatic preparation of isopentenyladenine-type and trans-zeatin-type cytokinins with radioisotope-labeling. *J Plant Res* **116**: 259-263
- Thomas SG, Phillips AL, Hedden P (1999) Molecular cloning and functional expression of *gibberellin 2-oxidases*, multifunctional enzymes involved in gibberellin deactivation. *Proc Natl Acad Sci U S A* **96**: 4698-4703
- Vanholme B, Grunewald W, Bateman A, Kohchi T, Gheysen G (2007) The tify family previously known as ZIM. *Trends Plant Sci* **12**: 239-244
- Waters MT, Moylan EC, Langdale JA (2008) GLK transcription factors regulate chloroplast development in a cell-autonomous manner. *Plant J* **56**: 432-444
- Wehmeyer N, Hernandez LD, Finkelstein RR, Vierling E (1996) Synthesis of small heat-shock proteins is part of the developmental program of late seed maturation. *Plant Physiol* **112**: 747-757
- Wilson AK, Pickett FB, Turner JC, Estelle M (1990) A dominant mutation in Arabidopsis confers resistance to auxin, ethylene and abscisic acid. *Mol Gen Genet* **222**: 377-383
- Yamada H, Suzuki T, Terada K, Takei K, Ishikawa K, Miwa K, Yamashino T, Mizuno T (2001) The Arabidopsis AHK4 histidine kinase is a cytokinin-binding receptor that transduces cytokinin signals across the membrane. *Plant Cell Physiol* **42**: 1017-1023
- Zhao Y, Christensen SK, Fankhauser C, Cashman JR, Cohen JD, Weigel D, Chory J (2001) A role for flavin monooxygenase-like enzymes in auxin biosynthesis. *Science* **291**: 306-309
- Zhao J, Peng P, Schmitz RJ, Decker AD, Tax FE, Li J (2002) Two putative BIN2 substrates are nuclear components of brassinosteroid signaling. *Plant Physiol* **130**: 1221-1229