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Programmed cell death in plants and caspase-like activities

Gaussand, G.M.D.J.

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Gwénaél Gaussand

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Programmed cell death in plants and caspase-like activities

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Gwénaél Martial Daniel Jean-Marie Gaussand

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Co-promotor: Dr. M. Wang

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*A ma famille,
papa, maman, mes frères
et mes grands-parents.*

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List of abbreviations

acd2, accelerated cell death 2
Ac-DEVD-AMC N-acetyl-Asp-Glu-Val-Asp-7-amino-4-methylcoumarin
Ac-DEVD-CHO N-acetyl-Asp-Glu-Val-Asp-aldehyde
Ac-VEID-AMC, N-acetyl-Val-Glu-Ile-Asp-7-amino-4-methylcoumarin
Ac-VEID-CHO, N-acetyl-Val-Glu-Ile-Asp-aldehyde
AIF, apoptosis inducing factor
AMC, 7-amino-4-methylcoumarin
APAF-1, apoptotic protease activating factor-1
APMSF, (4-Amidino-Phenyl)-Methane-Sulfonyl Fluoride
AtMCP1b and 2b, Arabidopsis metacaspase type I class gene b and Arabidopsis metacaspase type II class gene b
ATP/dATP, adenosine triphosphate / deoxyadenosine triphosphate
Bcl-2, B-cell lymphoma 2
BH domain, Bcl-2 homology domain
Biotin-DEVD-CHO, biotin-Asp-Glu-Val-Asp-aldehyde
BSA, bovine serum albumin
CA-074, (L-3-*trans*-(Propylcarbamyl) oxirane-2-carbonyl)-L-isoleucyl-L-proline
CARD, caspase activation and recruitment domain
CCH, copper chaperone homolog
CED, cell death-defective
CHAPS, 3-[(3-Cholamidopropyl) dimethylammonio]-1-propanesulfonate
CLSM, confocal laser scanning microscopy
cmk, chloromethylketone
DAPI, 4', 6-diamino-2-phenylindole
DCI, 3, 4 dichloroisocoumarin
DED, death effector domain
DFP, Di-isopropylfluorophosphate
DIABLO, direct IAP-binding protein with low pI
DISC, death-inducing signaling complex
dmk, diazomethylketone
DNA, deoxyribonucleic acid
DNase, deoxyribonuclease
DTT, Dithiothreitol
E-64, (L-transepoxy succinyl-leucylamide-(4-guanido)-butane or N-[N-(L-trans carboxyoxiran-2-carbonyl)-L-leucyl]-agmatine)
EDTA-Na₂, Ethylenediaminetetraacetic acid disodium salt
EDTA, ethylenediaminetetraacetic acid
EGL-1, egg-laying abnormal 1
EGTA, Ethylene-bis (oxyethylenenitrilo) tetraacetic acid Glycol ether diamine tetraacetic acid
ELS, embryo-like structure released out of the exine wall
ER, endoplasmic reticulum
FADD, Fas-associated via death domain
FAK, focal adhesion kinase
FasL, Fas ligand
fmk, fluoromethylketone
FDA, fluorescein-diacetate
FISH, fluorescence in situ hybridization
fmk, fluoromethylketone
FPLC fast protein liquid chromatography
GFP, green fluorescent protein
HEPES, 4-(2-hydroxyethyl)-1-piperazineethanesulfonic acid
HIC, hydrophobic interaction chromatography

HR, hypersensitive response
 IAP, inhibitor of apoptosis protein
 ICAD/CAD, inhibitor of caspase-activated DNase / caspase-activated DNase
 ICE, interleukin-1 β -converting enzyme or caspase-1
 kDa, kilodalton
 LeMCA1, *Lycopersicon esculentum* metacaspase 1
 Lsd, lesion simulating disease
 mcll-Pa, metacaspase type II in *Picea abies* (Norway spruce)
 MCS, multicellular structure inside the exine wall
 MEKK, mitogen activated protein kinase kinase
 MOPS, 3-(N-morpholino) propanesulfonic acid
 MPT, mitochondrial permeability transition
 MPTP, mitochondrial permeability transition pore
 MS, Mass spectrometry
 OMM, outer mitochondrial membrane
 p53, or TP53 tumor protein 53
 PARP, poly (ADP-ribose) polymerase
 PCD, programmed cell death
 PEMs, proliferating proembryogenic masses
 PMSF, phenylmethylsulphonylfluoride
 PPVs, precursor protease vesicles
 pRb, retinoblastoma protein
 RAIDD, Rip-associated protein with a death domain
 RNase, ribonuclease
 ROS, reactive oxygen species
 SI, self-incompatibility
 SIC, selected ion chromatogram
 Smac, second mitochondrial activator of caspases
 sns, spontaneous necrotic spots
 STAT-1, signal transducer and activator of transcription 1
 TE, tracheary element
 TLCK, Tosyl Lysyl ChloromethylKetone: 1-Chloro-3-tosylamido-7-amino-2-heptanone
 TMV, tobacco mosaic virus
 TNF, tumour necrosis factor
 TPCK, Tosyl Phenylalanyl Chloromethyl Ketone: 1-Chloro-3-tosylamido-4-phenyl-2-butanone
 TRADD, TNFRSF1A-associated via death domain
 TRAIL, TNF-related apoptosis-inducing ligand
 TUNEL, terminal deoxynucleotidyl transferase-mediated dUTP nick end labeling
 VPE, vacuolar processing enzyme
 YCA1, yeast caspase-1