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Transfer of "goods" from plants to humans: Fundamental and applied biochemical investigations on retaining glycosidases

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Transfer of “*goods*” from plants to humans

Fundamental and applied biochemical investigations on retaining glycosidases

Kassiani Kytidou

**Transfer of “goods” from plants to humans: Fundamental and applied biochemical investigations
on retaining glycosidases**

Kassiani Kytidou

Doctoral thesis, Leiden University 2020

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Transfer of “goods” from plants to humans: Fundamental and applied biochemical investigations on retaining glycosidases

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(University van Amsterdam)
Dr. H.J. Bosch,
(Wageningen University and Research Center)

*To my unofficial lab partners,
Dimitris and Foivos*

To my family,

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List of Abbreviations and acronyms

FD = Fabry disease
ERT = Enzyme replacement therapy
 α -GAL A or GLA = human alpha galactosidase
(α -)NAGA(L) = α -N-acetyl-galactosaminidase
(α -)NAGAEL = modified α -N-acetyl-galactosaminidase
 α -GAL = any alpha galactosidase, including plant enzymes
4MU = 4-Methylumbelliferyl
ABP = Activity-based probe
CBB = Coomassie brilliant blue
ConA = Concanavalin A
Gb3 = globotriaosylceramide
GlcCer = glucosylceramide
Cer = ceramide
lysoGb3 = globotriaosylsphingosine
LacCer = lactosylceramide
lysoLacCer = lactosylsphingosine
mAb = monoclonal antibodies
Gal-DNJ = deoxygalactonojirimycin
GBA = human lysosomal glucocerebrosidase
GAA = human lysosomal alpha glucosidase
 β GLUR = human lysosomal beta glucuronidase
 α MAN = human alpha mannosidase
 α FUC = human alpha fucosidase
 β GAL = human beta galactosidase
HPSE = Heparanase
MPR = Mannose-6-phosphate receptor
Man-6-P = Mannose-6-phosphate moieties
MR = Molecular Replacement
PD = Parkinson disease
GD = Gaucher disease
SDS-PAGE = sodium dodecyl sulfate polyacrylamide gel electrophoresis
HPLC = High Performance Liquid Chromatography
LC-MS/MS = Liquid chromatography–mass spectrometry with two mass spectrometers in tandem
HRP = horseradish peroxidase
NBD = nitrobenzoxadiazole
NBD-Gb3 = NBD-C12-globotriaosylceramide
PBS = Phosphate buffered saline
DAPI = 4',6-diamidino-2-phenylindole
BY2 cells = Bright Yellow 2 *Nicotiana tabacum* cells
BSA = Bovine serum albumin

RT = real time

A1.1 = *Nicotiana benthamiana* alpha galactosidase, identified in current thesis

B56 = *Nicotiana tabacum* beta glucosidase, identified in current thesis

List of activity-based probes coding

TB474 = Cy5 labelled alpha galactosidase activity-based probe

ME741 = Biotinylated alpha galactosidase activity-based probe

ME569 = Cy5 labelled epoxide beta glucosidase activity-based probe

ME869 = TAMRA/Biotinylated labelled epoxide beta glucosidase activity-based probe

JJB111 = Biotinylated labelled aziridine beta glucosidase activity-based probe

JJB367 = Cy5 labelled aziridine beta glucosidase activity-based probe

JJB75 = Bodipy-red labelled aziridine beta glucosidase activity-based probe

TB652 = Cy5 labelled aziridine beta galactosidase activity-based probe

JJB381 = Cy5 labelled aziridine alpha fucosidase activity-based probe

JJB383 = Cy5 labelled aziridine alpha glucosidase activity-based probe

JJB392 = Cy5 labelled aziridine beta glucuronidase activity-based probe

KY358 = aziridine beta glucosidase activity-based probe

MDW944 = Bodipy-red labelled epoxide beta glucosidase activity-based probe

TB482 = Cy5 labelled aziridine alpha mannosidase activity-based probe

TB434 = Cy5 labelled aziridine beta mannosidase activity-based probe