

Abbreviations

ABBREVIATIONS OF AMINO ACIDS

Ala (A)	Alanin
Arg (R)	Argenine
Asn (N)	Asparagine
Asp (D)	Aspartate
Cys (C)	Cystein
Gln (Q)	Glutamine
Glu (E)	Glutamate
Gly (G)	Glycin
His (H)	Histidine
Ile (I)	Isoleucine
Leu (L)	Leucine
Lys (K)	Lysine
Met (M)	Methionine
Phe (F)	Phenylalanine
Pro (P)	Proline
Ser (S)	Serine
Thr (T)	Threonine
Trp (W)	Tryptophane
Tyr (Y)	Tyrosine
Val (V)	Valine

GENERAL ABBREVIATIONS

AEBSF	4-(2-Aminoethyl)-bezene-sulfonylfluoride.HCl
Akt/PKB	Rac-serine/threonine protein kinase / Protein kinase B
AMP	Ampicilin
ATM	Ataxia telangiectasia mutated
ATP	Adenosine 5'-triphosphate
ATR	Ataxia telangiectasia -related
BAD	Bcl2-antagonist of cell death
BCR	Breakpoint cluster region
BIDMC	Beth Israel Deaconess Medical Center
BSA	Bovine serum albumin
C	Celsius
C3G	Guanine nucleotide-releasing factor 2
Ca ²⁺	Calcium
Cbl	Cbl E3 ubiquitin protein ligase
C.elegans	Caenorhabditis elegans
CHO	Chinese hamster ovary
CRIB	Cdc42/Rac interacting protein
CSF	Colony stimulating factor

D	Days
DAG	Diacylglycerol
DH	Dbl homology
D. melanogaster	Drosophila melanogaster
DMEM	Dulbecco's modified Eagle medium
DMSO	Dimethyl-sulphoxide
DNA	Deoxyribonucleic acid
DNA	PK DNA -dependent protein kinase
DTT	1,4-dithiothreitol
E	Embryonic day
E3b1/Abi1	Eps8 binding protein/Abelson interactor 1
ECL	Enhanced Chemiluminescence
E.coli	Escherichia coli
EDTA	Ethylenediaminetetra-acetic acid
EGF	Epidermal growth factor
EGTA	Ethyleneglycol-bis(beta-aminoethyl ether) tetra-acetic acid
ELISA	Enzyme linked immunosorbent assay
Eps8	Epidermal growth factor receptor kinase substrate 8
Erk	Extracellular regulated kinase
FACS	Fluorescent activated cell sorting
FBS	Fetal bovine serum
FITC	Fluorescein Isothiocyanate
FN	Fibronectin
GAP	GTPase activating protein
GDI	Guanine nucleotide dissociation inhibitor
GDP	Guanosine diphosphate
GEF	Guanine nucleotide exchange factor
GFP	Green fluorescent protein
GLUT4	Glucose transporter type 4
G-Protein	Guanine nucleotide regulatory proteins
Grp1/Arf	ADP-ribosylation factor 1
GSH	Glutathione
GSK	Glycogen synthase kinase 3
GST	Glutathione S-transferase
GTP	Guanosine triphosphate
GTT	Glucose tolerance test
H/hrs	hours
HA	Hemagglutinin
H+E	Hematoxylin and Eosin
HEPES	(N-2[Hydroxyethyl]piperazine-N'-[2-ethanesulfonic acid])
HGF	Hepatocyte growth factor
HPLC	High pressure/performance liquid chromatography
HRP	Horse Radish Peroxidase
IC ₅₀	Concentration causing 50% inhibition
IGF	Insulin like growth factor
IP	Immunoprecipitation

IP ₃	Inositol-1,4,5-triphosphate
IR	Insulin receptor
IRS	Insulin receptor substrate
ITT	Insulin Tolerance Test
JNK	c-jun kinase
KB	Kilobase(s)
kDa	Kilodalton
LB	Lenox broth
LPA	Lysophosphatidic acid
LY	LY294002
m	Meter(s)
M	Molar
MEF	Mouse embryonic fibroblast(s)
MeOH	Methanol
Min	Minute(s)
Mg ²⁺	Magnesium
mTor	Mammalian target of rapamycin
N	Number
NP-40	Nonidet P-40
PAK	p21-activated kinase
Par	Partitioning
PBS	Phosphate buffered saline
PC	Phosphatidylcholine
PCR	Polymerase chain reaction
PDGF	Platelet derived growth factor
PK1	PI3K dependent kinase
PE	Phosphatidylethanolamine
PH	Pleckstrin homology
PI	Phosphoinositide
PIK	Phosphoinositide kinase
PI3K	Phosphoinositide (PI) 3-kinase
PKC	Protein Kinase C
PLC	Phospholipase C
PLD	Phospholipase D
PMSF	Phenylmethylsulfonic acid
PS	Phosphatidylserine
p-Rex	PIP3-dependent Rac exchanger 1 protein
PTB	Phosphotyrosine binding
PTEN	Phosphatase and Tensin homolog deleted on chromosome Ten
POD	Peroxidase
Polyoma mT	Polyoma middle T antigen
PVDF	Polyvinylidene fluoride
PY	Phosphotyrosine

Rab5	Ras-related protein 5
Rpm	Revolutions per minute
RT	Room temperature
Ruk1/CIN85/SETA	SH3-domain kinase binding protein 1
Sec	Seconds
Src	Avian sarcoma virus
SH2	Src homology 2
SH3	Src homology 3
SDS/PAGE	Sodium dodecyl sulfate/polyacrylamide gel electrophoresis
Sos	Son of sevenless
SV40	Simian virus 40
TC10	T-complex protein 10A homolog
TEMED	N,N,N',N'Tetramethylethylenediamine
Tiam	T-lymphoma invasion and metastasis inducing protein
TLC	Thin layer chromatography
Tris	Tris(hydroxymethyl-)aminomethan
TUNEL	Terminal deoxynucleotidyl transferase-mediated dUTP nick end labeling
V _{max}	maximal velocity
WT	wild-type
WM	wortmannin

Acknowledgements

First of all I want to express my appreciation for Dr. Lewis Cantley. It is such a pleasure to experience a person with such an intelligent and wise mind. You create a very fun and inspiring atmosphere. Viva carnevale!

A big “Thank You” to Dr. David Fruman whom I very much admire for his kind personality and scientific skills. I enjoyed very much working with you in Boston and California. What would I have done without you? And thank you for revising my manuscripts!

I also want to acknowledge my collaborators Dr. Koji Ueki the Ronald Kahn lab (“Saskia, we are on the right truck”) from and Dr. Sheila Thomas. Furthermore, I want to acknowledge John Watt (“Cool beans”), Nicole Logdson, Nikki Madson, Wyatt Shaw and Monica Kosmatka for their help with maintaining the mouse colonies and performing GTT and ITTs.

I want to further thank the people who edited the various chapters of this thesis: Dr. Heike Keilhack, Dr. Stefanie Schalm, Ji Luo (Dr. in spe) & Dr. Robin Ketteler, Dr. Katja Lamia and Dr. Christina Gewinner.

Thanks to the whole Cantley lab for fruitful discussions as well as fun time.

This work was supported by the Boehringer Ingelheim Fonds. I would like to thank Monika Beutelspacher and Herman Froehlich for creating a warm and friendly environment for the BIF fellows.

Ein besonderes THANK YOU an den besten Daddy!! If just everyone had a dad like I do...