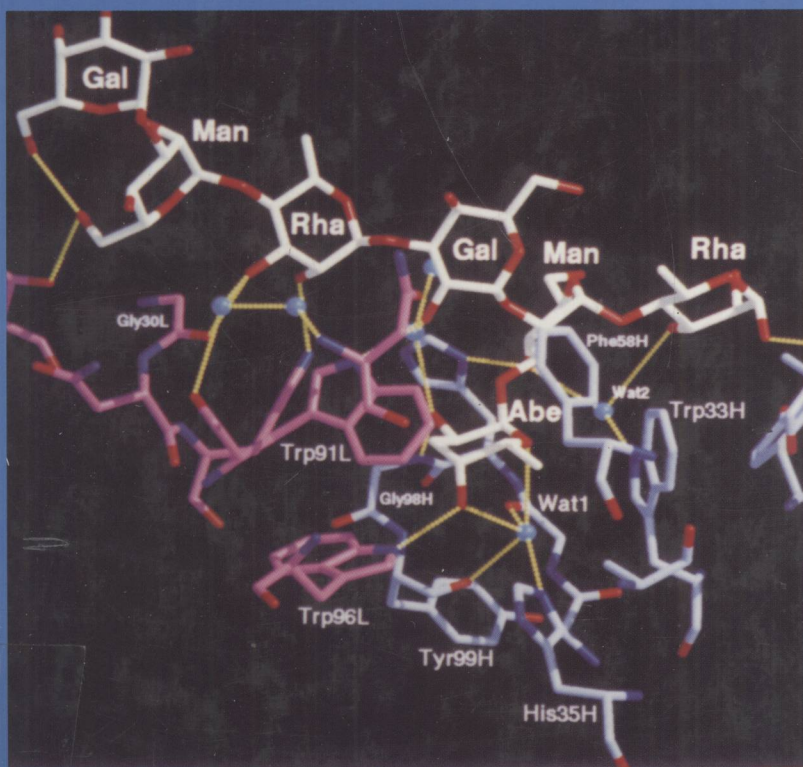


B. Ernst, G. W. Hart, P. Sinaÿ

Carbohydrates in Chemistry and Biology

Part I: Chemistry of Saccharides

Vol. 1



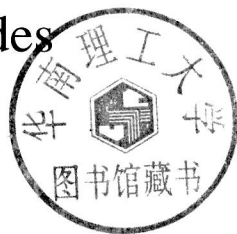
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Beat Ernst, Gerald W. Hart, Pierre Sinay

Carbohydrates in Chemistry and Biology

Part I Chemistry of Saccharides

Vol. 1 Chemical Synthesis of
Glycosides and Glycomimetics



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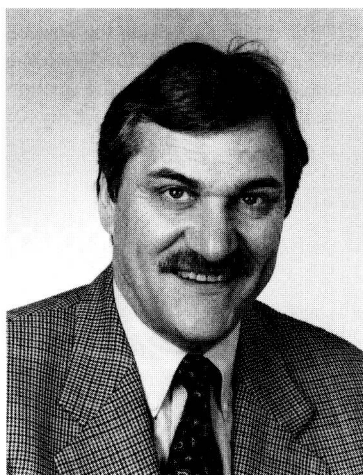
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Beat Ernst studied chemistry at the ETH in Zürich, Switzerland, where he completed his PhD-thesis about novel tricyclic hydrocarbons under the guidance of Professors Oskar Jeger and Camille Ganter. After his post-doctoral research on tirandamycinic acid with Professor R. E. Ireland at Caltech in Pasadena, he joined the Central Research Laboratories of Ciba-Geigy (now Novartis) in Basel where he headed the Carbohydrate Research Section. In 1998 he became Professor of Molecular Pharmacy at the University of Basel, Switzerland. His major research interests are Carbohydrate Chemistry and Glycobiology—mainly the chemical and enzymatic syntheses of oligosaccharides, investigation of carbohydrate/lectin interactions and carbohydrate mimics. In 1991 he was awarded the Werner-Price of the Swiss Chemical Society, and in 1993 he became CIBA-fellow for his research contributions.



Gerald Warren Hart is Director and DeLamar Professor of Biological Chemistry at Johns Hopkins University in Baltimore, MD. He studied biology, and chemistry at Washburn University and completed his PhD-thesis in developmental biology at Kansas State University before he was appointed assistant professor of Biological Chemistry at Johns Hopkins University School of Medicine. From 1993 to 1997 he held a chair at the department of Biochemistry and Molecular Genetics at the University of Alabama before he returned to Johns Hopkins University. In 1989 he founded the journal *Glycobiology* which became the leading journal in the field. His research results and contributions to the field of glycobiology are honored with many prizes and awards—President of the Society of Glycobiology, Member of the Council of the ASBMB, First International Glycoconjugate Organization Award, just to name a few.



Pierre Sinaÿ studied chemistry at Ecole Nationale Supérieure des Industries Chimiques, Nancy, France, and received his PhD from the University of Nancy. After his post-doctoral research at Harvard University he became Professor at the University of Orléans before he was appointed professor of organic chemistry at Pierre et Marie Curie University and Ecole Normale Supérieure in Paris. His main research focuses on the chemical synthesis of oligosaccharides of biological relevance and on the development of new synthetic methods in the carbohydrate field. He is Editor-in-Chief of the journal *Carbohydrate Letters* and he has published numerous scientific papers and patents. In 1987 he was elected president of the organic chemistry division of the French Chemical Society. In 1978 he was awarded the Le Bel Price of the French Chemical Society, in 1996 he was triple-honoured with the Desnuelles Price, the Bethellot Medal and with the election as corresponding member of the French Academy of Sciences.

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Abbreviations Used in Volumes 1 and 2

α 1,3-GalT	α 1,3-Galactosyltransferase
α 2,3-SialT	α 2,3-Sialyltransferase
α 2,6-SialT	α 2,6-sialyltransferase
α GalF	α -Galactosyl fluoride
α GlcF	α -Glucosyl fluoride
α MuNeuAc	4-Methylumbelliferone α -D- <i>N</i> -acetylneuraminic acid
α pNPFuc	<i>para</i> -Nitrophenyl α -L-fucopyranoside
α pNPGal	<i>para</i> -Nitrophenyl α -D-galactopyranoside
α pNPGalNAc	<i>para</i> -Nitrophenyl 2-acetamido-2-deoxy- α -D-galactopyranoside
α pNPGlc	<i>para</i> -Nitrophenyl α -D-glucopyranoside
α pNPGlcNAc	<i>para</i> -Nitrophenyl 2-acetamido-2-deoxy- α -D-glucopyranoside
α pNPMann	<i>para</i> -Nitrophenyl α -D-mannopyranoside
α pNPNeuAc	<i>para</i> -Nitrophenyl- α -D- <i>N</i> -acetylneuraminic acid
Å	Angstrom
aa	amino acid
Ac	acetyl
AcHmb	<i>N</i> -2-acetoxy-4-methoxybenzyl
ACP	acyl carrier protein
AF	aggregation factor
AFM	atomic force microscopy
AgOTf	silver trifluoromethanesulfonate (silver triflate)
AGP	arabinogalactan protein
<i>alg</i>	asparagine-linked glycosylation
All	allyl
AllNAc	<i>N</i> -Acetylallosamine
Aloc	Allyloxycarbonyl
APC	antigen-presenting cell
APP	acute phase protein
APS	adenosine phosphosulfate
APS	ammonium persulfate

AR	acrosome reaction
ARIS	acrosome reaction-inducing substance
ASGP-R	asialoglycoprotein receptor
Asialo-GM ₁	β -D-Gal(1-3)- β -D-GalNAc(1-4)- β -D-Gal(1-4)- β -D-Glc-O-Cer
Asn	asparagine
Asn GT	asparagine glucosyltransferase
ASTF-GP	(GalGlcNAcMan) ₂ ManGlcNAc ₂ Asn
β 1,4-GalT	β 1,4-Galactosyltransferase
β ManF	β -Mannosyl fluoride
β MuGlc	4-Methylumbelliferyl β -D-glucopyranoside
β MuGlcNAc	4-Methylumbelliferyl 2-acetamido-2-deoxy- β -D-glucopyranoside
β MuXyl	4-Methylumbelliferyl β -D-xylopyranoside
β oNPGal	<i>ortho</i> -Nitrophenyl β -D-galactopyranoside
β oNPGlc	<i>ortho</i> -Nitrophenyl β -D-glucopyranoside
β pCIPMan	<i>para</i> -Chlorophenyl β -D-mannopyranoside
β PhGal	Phenyl β -D-galactopyranoside
β PhGlc	Phenyl β -D-glucopyranoside
β pNP2dGlc	<i>para</i> -Nitrophenyl 2-deoxy- β -D- <i>arabino</i> -hexopyranoside
β pNPGal	<i>para</i> -Nitrophenyl β -D-galactopyranoside
β pNPGalNAc	<i>para</i> -Nitrophenyl 2-acetamido-2-deoxy- β -D-galactopyranoside
β pNPGlc	<i>para</i> -Nitrophenyl β -D-glucopyranoside
β pNPGlcNAc	<i>para</i> -Nitrophenyl 2-acetamido-2-deoxy- β -D-glucopyranoside
β pNPMan	<i>para</i> -Nitrophenyl β -D-mannopyranoside
β pNPXyl	<i>para</i> -Nitrophenyl β -D-xylopyranoside
β pOMePhGlc	<i>para</i> -Methoxyphenyl β -D-glucopyranoside
β VGal	Vinyl β -D-galactopyranoside
9-BBN	9-Borabicyclo[3.3.1]nonane
BDA	butane diacetal
BHK	baby hamster kidney
bFGF	basic fibroblast growth factor
BLAST	basic alignment search tool
BM	basement membrane
BMP	bis(monoacylglycero)phosphate
Bn	benzyl
Boc	<i>tert</i> -butoxycarbonyl
BOP	benzotriazol-1-yloxy-tris(dimethylamino)phosphonium hexafluorophosphate
bp	base pair
Bu	butyl
BU ₄ NSSTr	Tetrabutylammoniumsaltotriphenylmethanethiol
Bz	benzoyl
Bzl	benzyl
CAA	carbohydrate amino acids
CAM	cell adhesion molecule
CAN	Cer(IV)ammoniumnitrate