

**From researcher to entrepreneur
and back
- my personal story -**

Gordan Lauc
University of Zagreb
Genos Ltd

Effects of phosphate group of piridoxal phosphate on binding to alkaline phosphatase

Diploma work, summer 1991



Biochemistry of stress

Stressin and Natural Killer Cell

War Stress in the Former Yugoslavia

M Flögel, S Š Goreta and G Lauc
University of Zagreb, Zagreb, Croatia

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impairments including suicide, homicide, and other types of violence.

Historical and Political Background of the Conflict

The federal republics of prewar Yugoslavia had national and cultural identities with distinct historical backgrounds. At times in the past they were sovereign states, and they have been trying to reestablish their independence ever since they lost it. Neither the first (monarchist) nor the second (communist) Yugoslavia

Historical and Political Background of the Conflict
Migrations, Ethnic Cleansing, and Social Impact
Effects on Health
Effects on Mortality
Effects on Social Behavior and Violence
Conclusion

Biochemistry. I. Huttlera 4. 31000 Osijek. Croatia

- 1994 PhD in Mainz



Institut für Physiologische Chemie

days (1000 hours) in a bus



- 1995 Building the lab in Zagreb



US Academies, 2012: “Glycoscience should be a priority for the next decade”

NATIONAL ACADEMY OF SCIENCES
NATIONAL ACADEMY OF ENGINEERING
INSTITUTE OF MEDICINE
NATIONAL RESEARCH COUNCIL

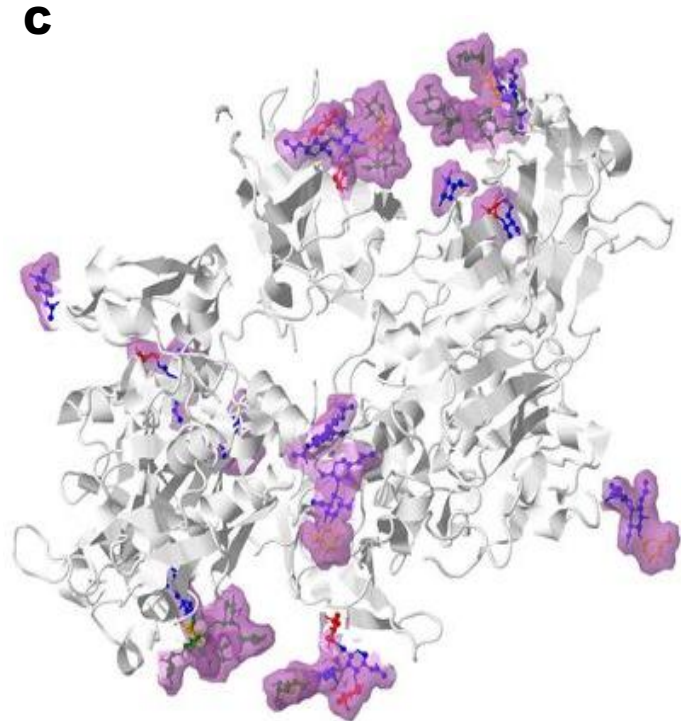
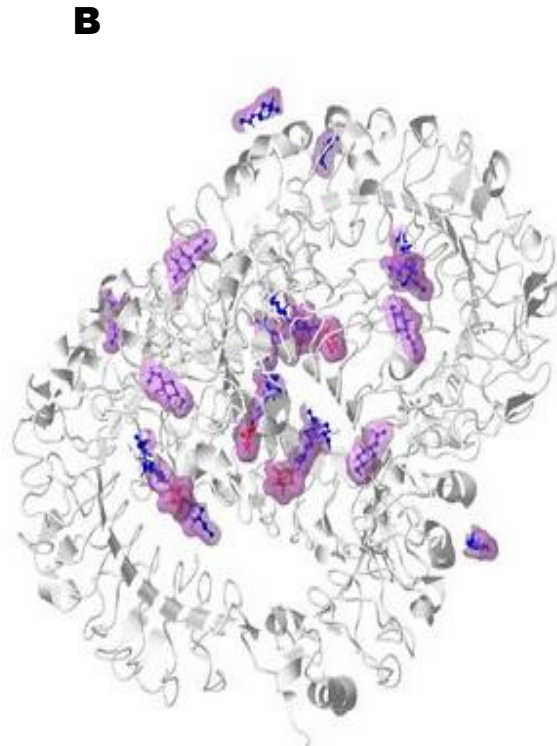
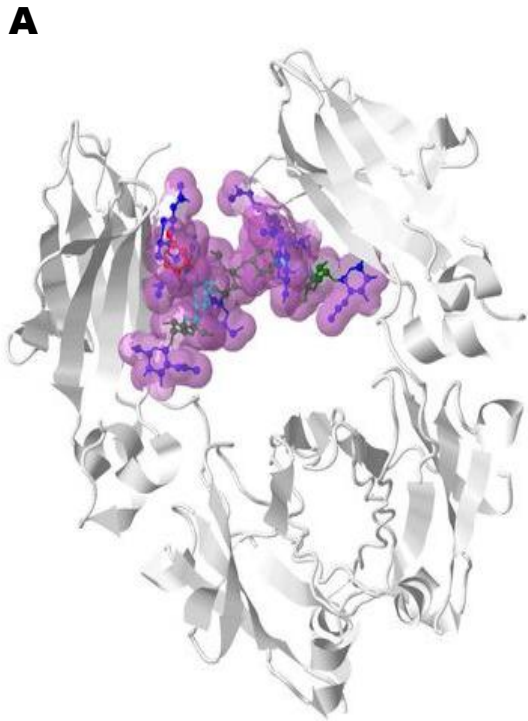
REPORT

IN BRIEF

Transforming Glycoscience: A Roadmap for the Future

A new focus on glycoscience, a field that explores the structures and functions of sugars, promises great advances in areas as diverse as medicine, energy generation, and materials science, this report finds. Glycans—also known as carbohydrates, saccharides, or simply as sugars—play central roles in many biological processes and have properties useful in an array of applications. However, glycans have received little attention from the research community due, in large part, to a lack of tools to probe their often complex structures and properties. This report presents a roadmap for transforming glycoscience from a field dominated by specialists to a widely studied and integrated discipline, which could lead to a more complete understanding of glycans and help solve key challenges in diverse fields.

Studying a protein without its glycans is like studying a fly without its wings



Glycoscience in 1992?



W.E.G Muller



DIG Glycan
differentiation kit



- 2007 Glycobiology of Stress

Stressin and Natural Killer Cell Activity in Professional Soldiers^a

Biol. Chem., Vol. 380, pp

**Purification
of Stress-A**

GORDAN LAUC,^a SANJA DABELIĆ, JERKA DUMIĆ,
AND MIRNA FLÖGEL

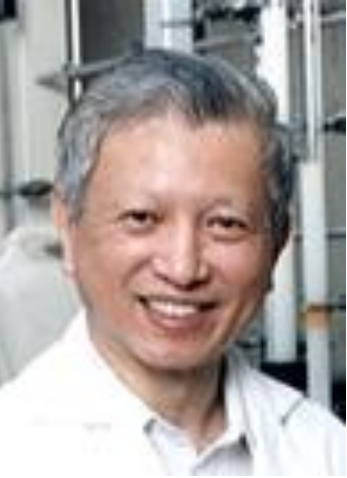
*Department of Biochemistry and Molecular Biology, Faculty of
Pharmacy and Biochemistry, University of Zagreb, Ante Kovačića 1,
10000 Zagreb, Croatia*

DEPARTMENT OF BIOCHEMISTRY

**Gordan Lauc^{1,*},
Sanja Dabelić¹ and**

**Expression of galectin-3 in cells exposed to stress
- roles of Jun and NF- κ B**

- 1998 Johns Hopkins
University, Baltimore, MD



Y.C. Lee



- 2010 University of Osijek School of Medicine



- DNA laboratory for the identification of war victims



Identification of skeletal remains

šifra	D3S1358		VWA		FGA		amelogenin		TH01		TPOX		CSF1PO		D5S818		D13S317		D7S820		šifra	suma	!
Ćelije NN 152	15	16	16	17	21	23	x	y	8	9	11	12	10	11	10	13	11	12	10	14	Ćelije NN 152	9	!
RMP-1270	16	17	17	19	19	21	x	x	9	9,3	8	11	10	12	12	13	11	12	9	10	RMP-1270	9	!
RMP-674	15	18	14	16	21	22	x	x	6	9	8	11	10	12	10	11	9	12	10	12	RMP-674	9	!
RMP-730	15	17	16	17	?	23	x	x	6	8	11	11	11	12	10	12	11	12	10	11	RMP-730	9	!
RMP-731	16	19	16	17	20	21	x	y	6	9	8	12	10	11	11	13	11	12	8	14	RMP-731	9	!
RMP-O-50	16	17	17	17	23	24	x	y	8	9	8	11	10	12	10	13	10	11	10	10	RMP-O-50	9	!
RMP-321	14	15	13	16	21	23	x	x	9	9,3	9	11	10	11	10	12	8	12	9	10	RMP-321	9	!
RMP-1264	15	16	16	19	20	26	x	x	6	9	8	11	10	12	11	13	8	11	10	11	RMP-1264	8	
RMP-645	14	15	17	18	21	?	x	x	8	10	8	10	11	12	10	13	11	11	10	10	RMP-645	8	
RMPO-26	15	16	15	16	20	21	x	x	8	8	8	11	10	10	11	11	11	12	9	10	RMPO-26	8	
RMPO-32	14	15	16	19	19	23	x	x	9	9,3	8	8	11	11	11	13	12	12	8	10	RMPO-32	8	
RMP-1247	15	16	16	19	21	22	x	x	7	8	10	11	10	10	10	12	8	11	8	8	RMP-1247	8	
RMP-1249	15	17	19	19	21	22	x	x	8	9	9	11	10	11	10	12	11	12	10	10	RMP-1249	8	
RMP-1250	16	17	18	19	20	21	x	x	9	9	10	11	10	13	10	12	11	11	8	10	RMP-1250	8	
RMP-1269	15	16	15	19	21	23	x	x	6	9	11	11	10	12	12	13	10	11	10	11	RMP-1269	8	
RMPO-17	16	17	17	19	23	24	x	x	6	9,3	11	11	11	12	12	13	11	13	10	12	RMPO-17	8	
RMP-656	16	17	16	17	22	25	x	y	9	9,3	11	12	11	13	12	13	11	11	10	10	RMP-656	8	
RMP-670	15	16	15	17	20	23	x	y	6	9	10	11	10	11	8	11	11	13	10	11	RMP-670	8	
RMP-704	16	18	14	16	21	25	x	x	9	9	8	11	11	11	11	13	11	11	8	9	RMP-704	8	
RMP-707	14	15	14	16	23	24	x	x	7	9,3	8	11	11	12	12	13	12	14	10	10	RMP-707	8	
RMP-754	15	16	16	16	23	27	x	y	6	9	11	11	10	10	13	13	11	11	8	8	RMP-754	8	
RMP-758	15	17	15	17	21	24	x	x	7	8	8	11	10	12	11	12	9	11	8	10	RMP-758	8	
RMP-802	15	18	16	16	20	21	x	y	6	9	8	11	10	12	12	13	11	13	8	9	RMP-802	8	
RMP-811	16	18	17	18	21	22	x	x	6	9	8	11	10	11	11	12	9	12	8	10	RMP-811	8	

- GGT - Gorea Genotipizacija Ltd



- BioMed Reagents Ltd



BioMed Reagents Ltd

'Moving Biotechnology Forward'

25, Claremont Place
Necastle upon Tyne
NE2 4AA

Tel: 0191 2228252 Fax: 0191 2095200

e-mail office@biomed.demon.co.uk

— Broj zaposlenih — Prihod





A knowledge-based company





GENOS®

Genos currently employs 8 PhDs and 9 PhD students



Olga



Ana



Vedrana



Mislav



Maja



Toma



Jasminka



Petar



Julija



Ivona



Irena



Lucija



Frano



Jerko



GENOS®

Continuous development of new products and services



DNA test faktora koagulacije



Utvrđivanje poremećaja broja kromosoma (Brzi test trisomija)



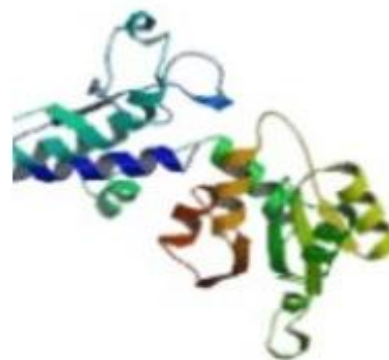
Utvrđivanje spola djeteta iz krvi majke



Test utvrđivanja očinstva



DNA test intolerancije laktose



DNA test za sekretor status



Prenatal paternity testing

Int J Legal Med
DOI 10.1007/s00414-008

TECHNICAL NOTE

Non-invasive

**Jasenka Wagner • Srđan
Damir Marjanović •**



Tests - Human DNA
Tests - Animal DNA
Expertise
Pricelist



Coagulation Factors DNA Test



Chromosomal Abnormalities Test (Rapid Trisomies Test)



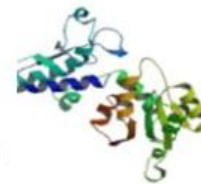
Non-Invasive Prenatal Sex Determination



Paternity Test



Lactose Intolerance DNA Test



Secretor Status DNA Test

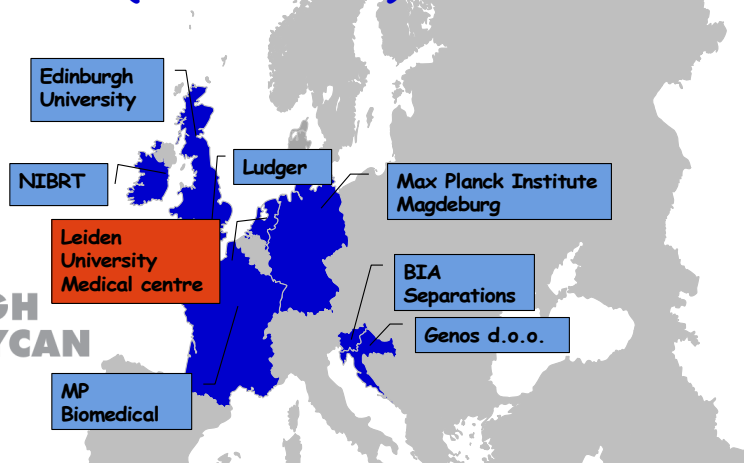
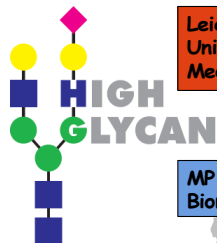
il blood



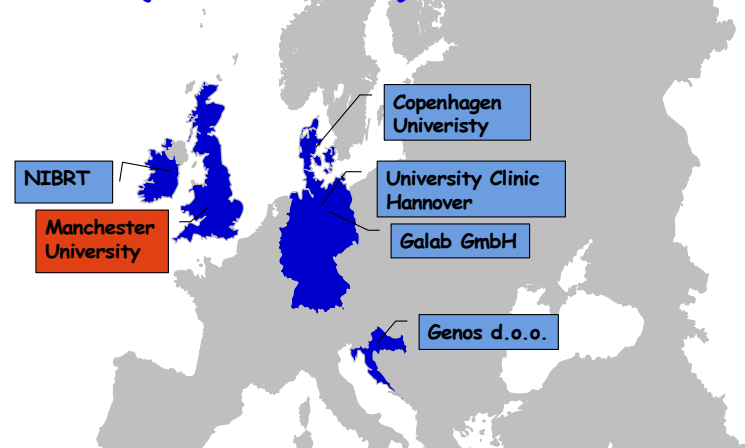
Genos was awarded over Euro 4.5 M in FP7 grants



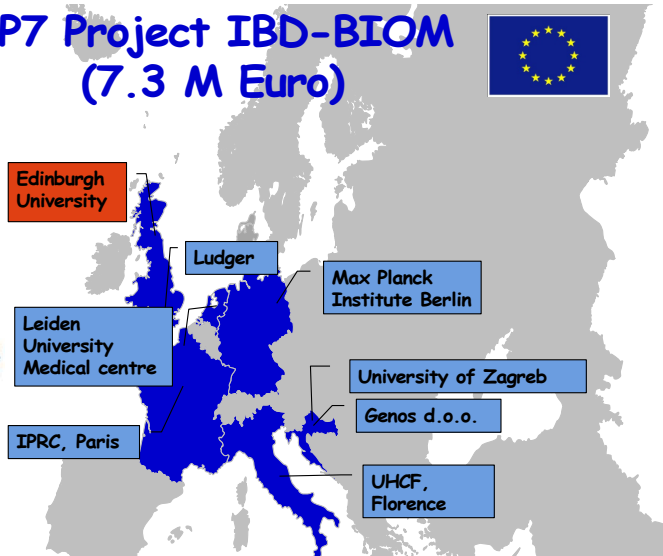
FP7 Project HighGlycan (7.2 M Euro)



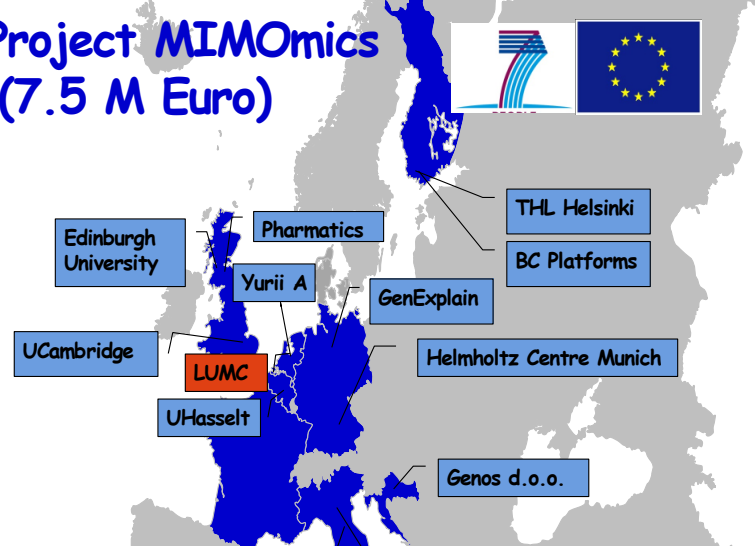
FP7 Project GlycoBioM (6.4 M Euro)



FP7 Project IBD-BIOM (7.3 M Euro)



FP7 Project MIMOmics (7.5 M Euro)

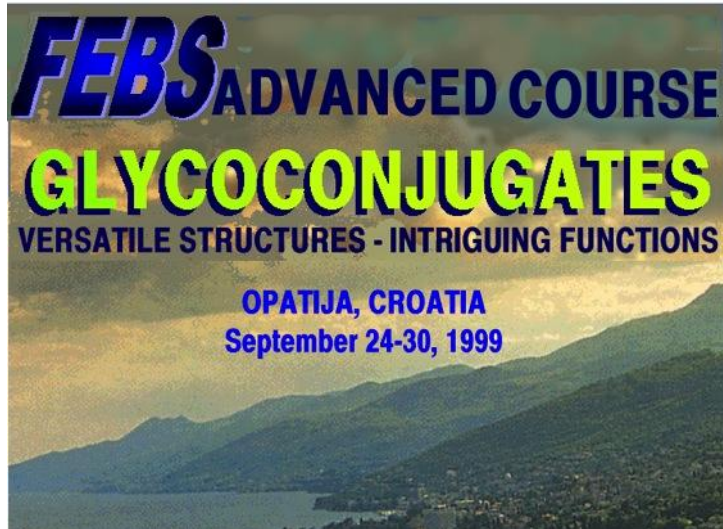


- How to get invited into FP-consortia?

- a) To be one of global leaders in the field
- b) To be a good friend with coordinator, or an influential partner



Our way to European funding



2nd **FEBS** ADVANCED COURSE
GLYCOCONJUGATES
VERSATILE STRUCTURES - INTRIGUING FUNCTIONS
DUBROVNIK, 2001

Satellite Meeting to the 30th FEBS Congress and 9th IUBMB Conference
GLYCOPROTEOMICS:
protein modifications
for versatile functions
June 28-30, Hotel Dubrovnik Palace, Dubrovnik, Croatia

LECTURERS:

- N. V. Bovin (Russian Federation)
- R. Cummings (USA)
- A. Dell (UK)
- H. H. Freeze (USA)
- R. Gerardy-Schahn (Germany)
- R. Jefferis (UK)
- J. P. Kamerling (The Netherlands)
- Y. C. Lee (USA)
- H. Narimatsu (Japan)
- G. Opdenakker (Belgium)
- P. M. Rudd (UK)
- R. L. Schnaar (USA)
- N. Sharon (Israel)
- N. Taniguchi (Japan)
- S. J. Turco (USA)
- C.-W. von der Lieth (Germany)

TOPICS:

- Glycoprotein Structure and Function
- Glycosyltransferases and Glycosidases
- Lectins
- Glycoimmunology and Glycopathology
- Glycosylation in Development
- Glycotechnology and Glycotherapeutics
- Analytical Methods in Glycoscience
- Bioinformatics in Glycobiology

Scientific Committee: Mirna Flögel, president (Croatia), Marija Heffer-Lauc (Croatia), Johannes P. Kamerling (The Netherlands), Pauline M. Rudd (UK), Ronald L. Schnaar (USA), Nathan Sharon (Israel), Salvatore J. Turco (USA)

Organising Committee: Gordana Lauc, president (Croatia), Jerka Dumić, secretary (Croatia), Roberto Antolović (Croatia), Karmela Barbić (Croatia), Sanja Dabelić (Croatia), Irena Landeka (Croatia), Gordana Maravić (Croatia), Vladimir Mrša (Croatia)

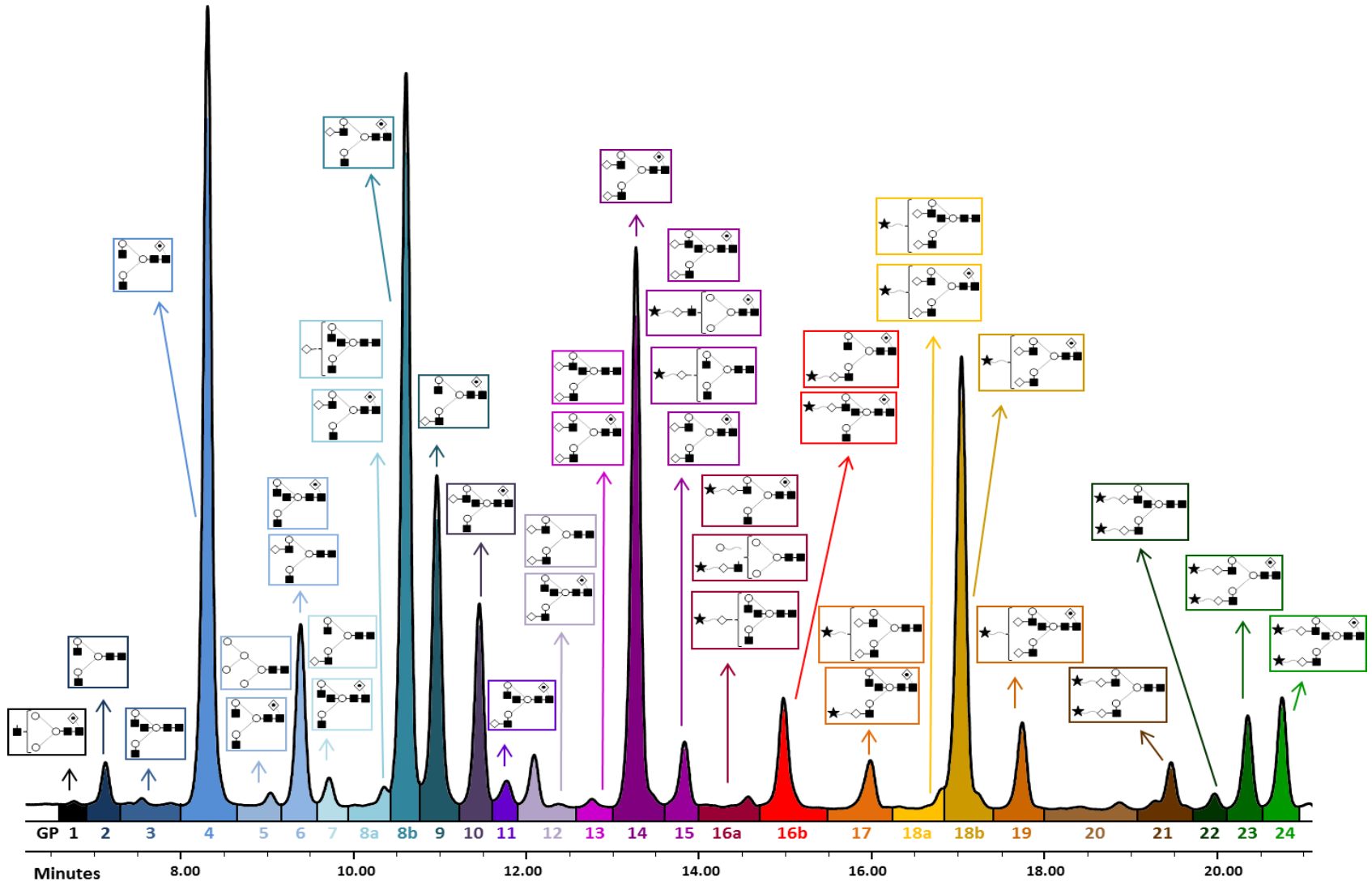
The poster features a molecular structure diagram of a glycoprotein at the top left. The main text is in a blue and white color scheme. At the bottom, there is a photograph of a coastal town with a large stone fortification overlooking the sea.

Year	Non-funded	Funded
2003		RTN GlycoGold
2004		GenDep
2005	INCO - EuroPharm	
2006		INCO - EuroPharm
2007	Sepsis, NanoAngiogenesis	RegPot - INTEGERS
200	IAPP - ADNAA	ITN - EuroGlycoArrays
20	HisysMed	
20	RegPot IntegraLife IAPP - ADNA	GlycoBioM
201		HighGlycan
201	GlycoStrat	IBD-BIOM, MIMOmics, IAPP-HTP-GlycoMet
20	ITN-Multiplex, CardiOmic	RegPot IntegraLife, Pain-Omics (Food-Omics)

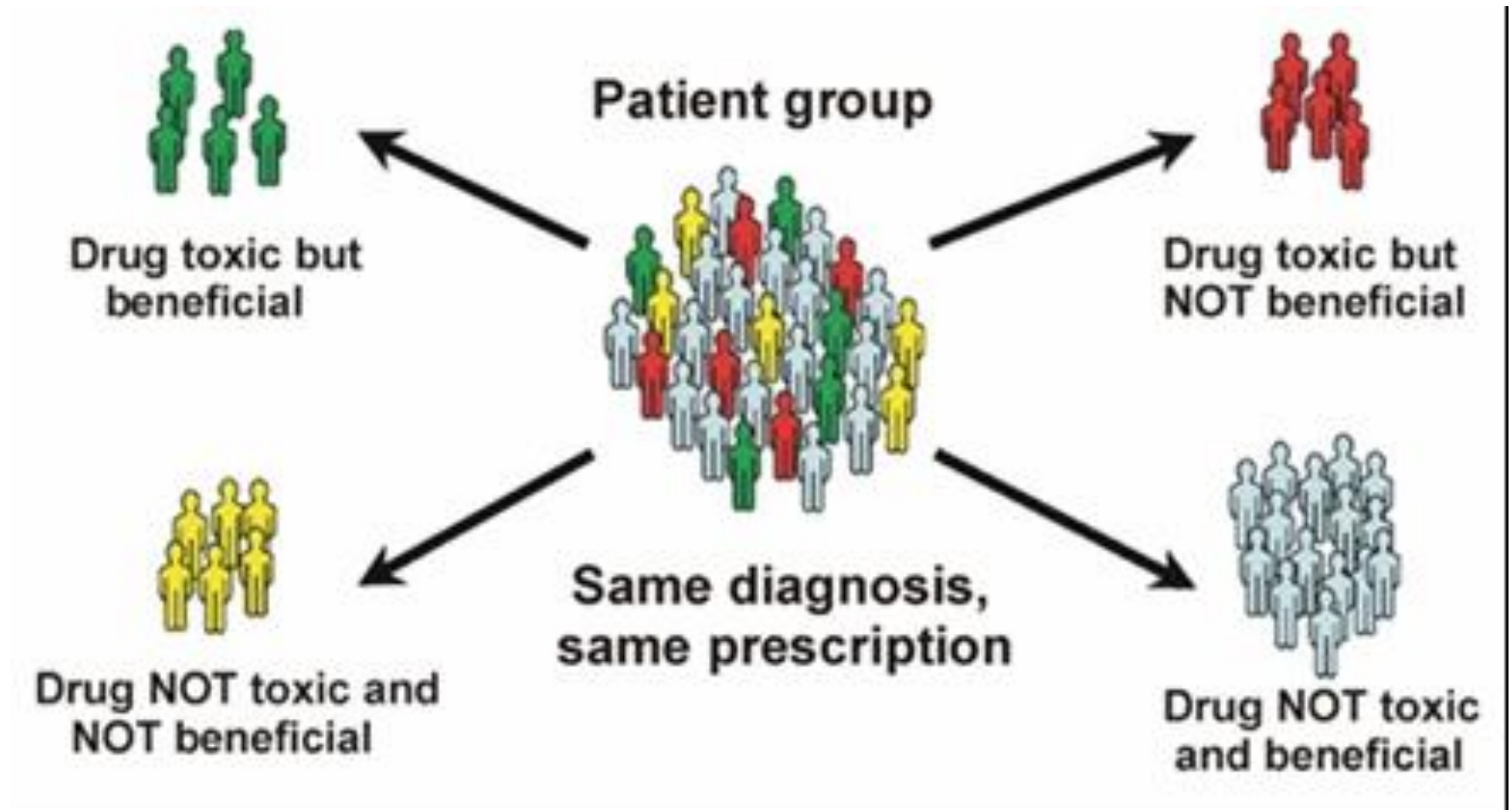
Funding of FP projects

Year / Project	University	Genos
2003 / RTN GlycoGold	5.000	
2004 / GenDep	7.000	
2006 / EuroPharm	330.000	
2007 / Integers	550.000	
2008 / EuroGlycoArrays	200.000	
2010 / GlycoBioM		50.000
2011 / HighGlycan		990.000
/ IBD-BIOM		
/ MIMOmics		
/ Integra-Life		
/ HTP-GlycoMet		
/ PainOmics		

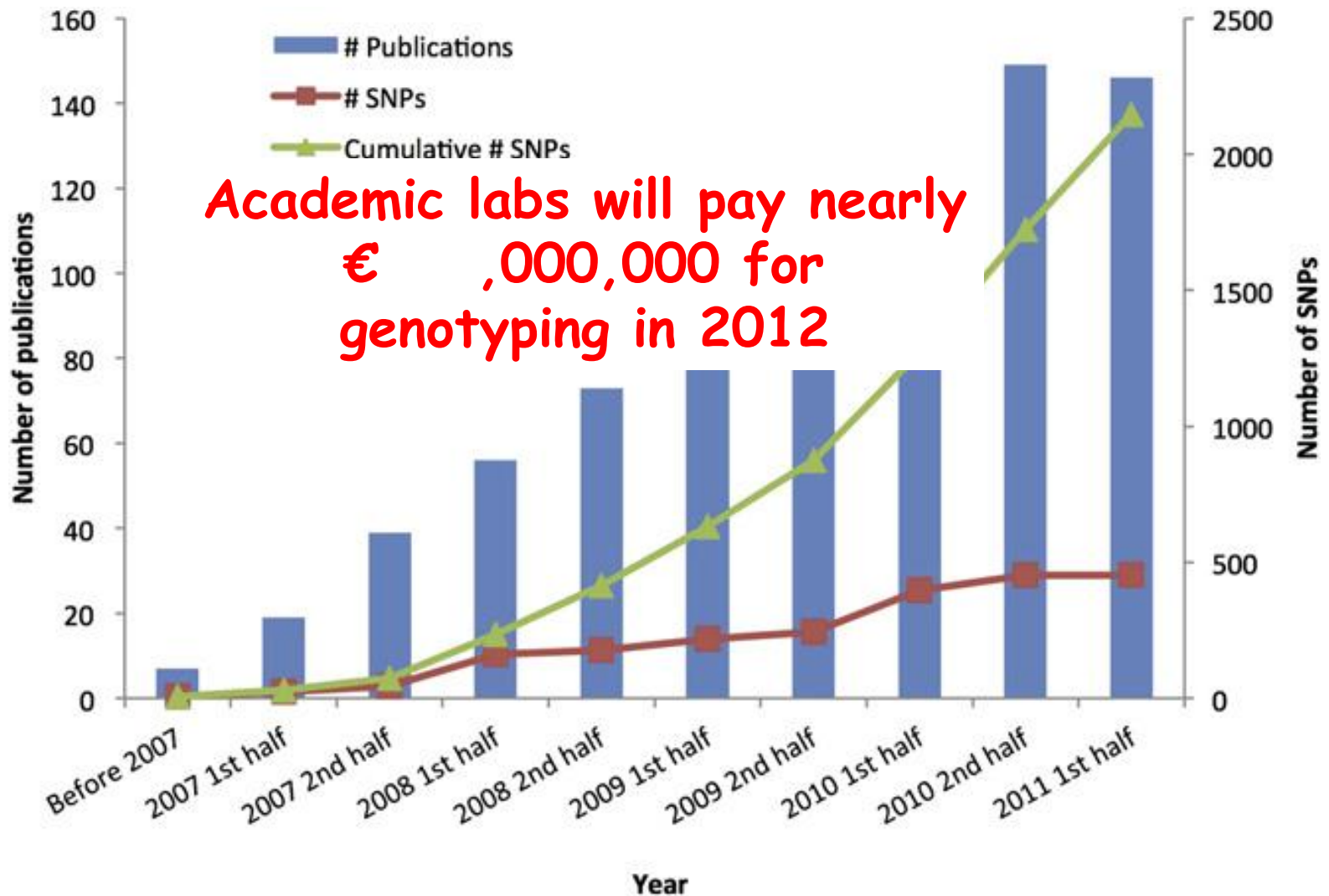
Genos is currently global leader in high-throughput glycomics



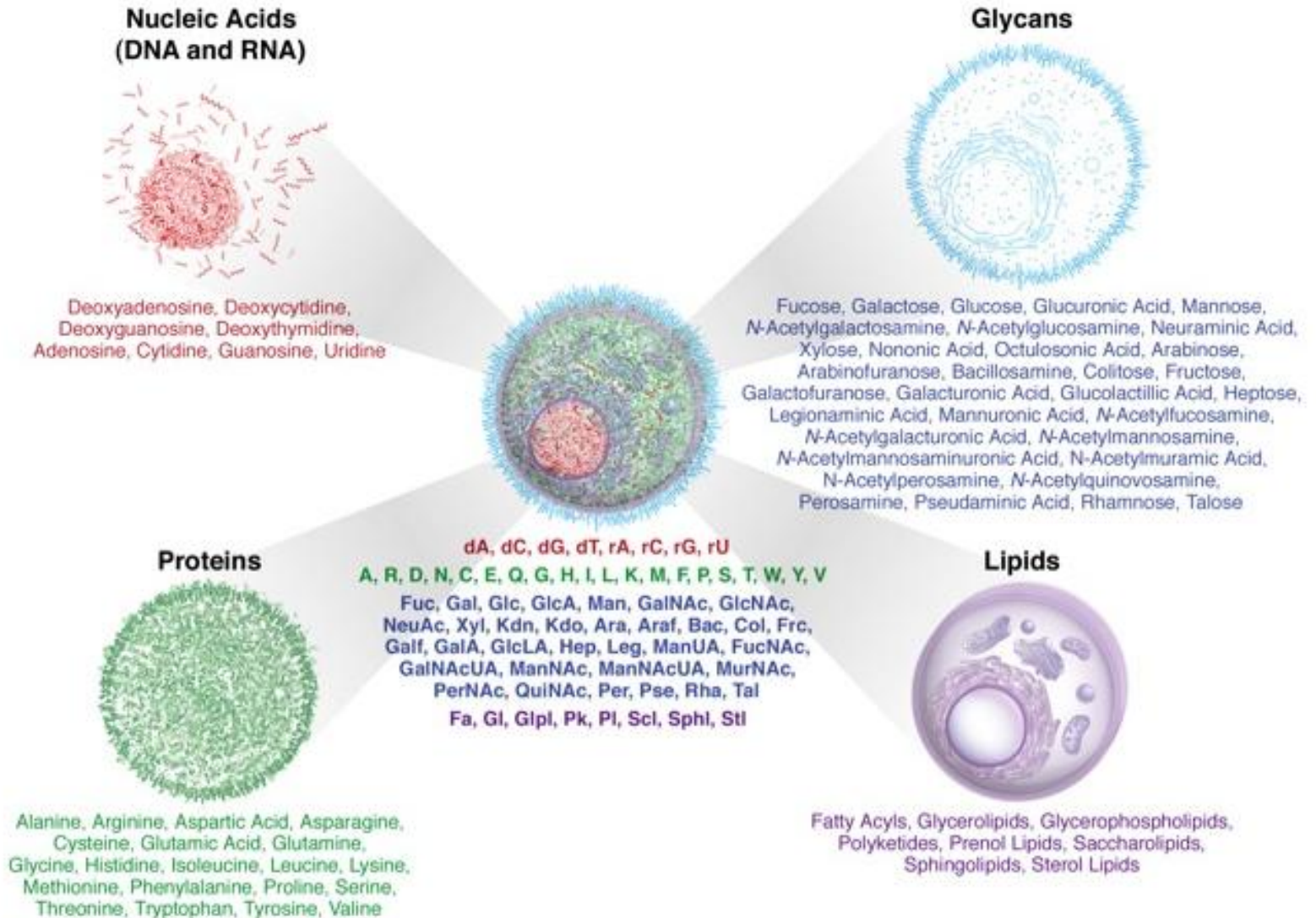
Efficient patient stratification is the holy grail of modern medicine



Genome wide association studies initiated revolution in genetics

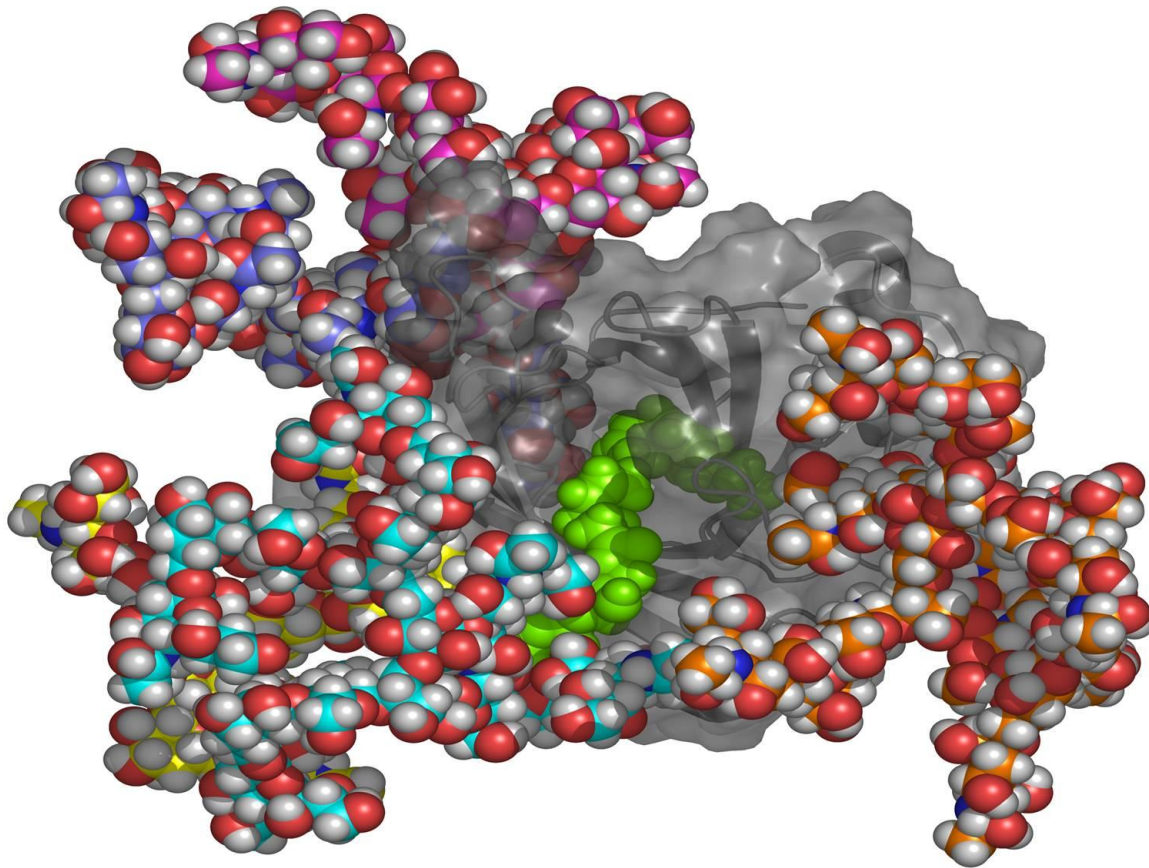


DNA is only one of the four principal components of the cell





Large-scale studies which will combine genomic, proteomic and **glycomic** data are needed to enable understanding of complex human diseases





GlycoBioGen Consortium

Human Genetics Unit

Alan Wright
Nick Hastie

Tim Spector



Pauline Rudd



Mark McCarthy



Manfred Wuhrer
Jeanine Houwing



Harry Campbell
Jim Wilson
Igor Rudan



Jerome Rotter
Dermot McGovern

Susak island

Rab island, 5 villages
Banjol
Barbat
Lopar
Rab
Supetarska draga



UPPSALA
UNIVERSITET
Ulf Gyllensten



Vlatka Zoldoš
Kristian Vlahoviček

Vis island, 2 villages
Komiza
Vis



Wei Wang

Lastovo island

Mljet island



The first population study of the human plasma glycome

Journal of
proteome
research

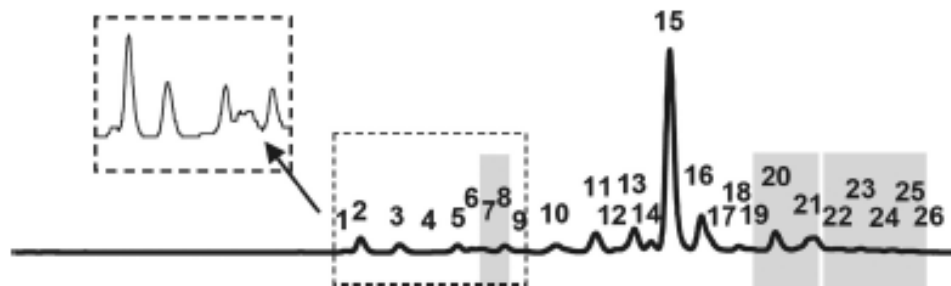
Article

Variability, Heritability and Environmental Determinants of Human Plasma N-Glycome

Ana Knezevic, Ozren Polasek, Olga Gornik, Igor Rudan, Harry Campbell, Caroline Hayward, Alan Wright, Ivana Kolcic, Niaobh O'Donoghue, Jonathan Bones, Pauline M. Rudd, and Gordan Lauc

J. Proteome Res., 2009, 8 (2), 694-701 • Publication Date (Web): 26 November 2008

Downloaded from <http://pubs.acs.org> on February 6, 2009



The first population study of the human IgG glycome

Technological Innovations and Resources

✉ Author's Choice

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This paper is available on line at <http://www.jbc.org>

High Throughput Isolation and Glycosylation Analysis of IgG–Variability and Heritability of the IgG Glycome in Three Isolated Human Populations*[§]

Maja Pučić†, Ana Knežević†, Jana Vidić§, Barbara Adamczyk¶, Mislav Novokmet†, Ozren Polašek||, Olga Gornik**, Sandra Šupraha-Goreta**, Mark R. Wormald‡‡, Irma Redžić**, Harry Campbell§§, Alan Wright¶¶, Nicholas D. Hastie¶¶, James F. Wilson§§, Igor Rudan||§§, Manfred Wuhrer|||, Pauline M. Rudd¶, Djuro Josić^{ab}, and Gordan Lauc†^{***c}

Genomics Meets Glycomics—The First GWAS Study of Human N-Glycome Identifies HNF1 α as a Master Regulator of Plasma Protein Fucosylation

Gordan Lauc^{1,2[¶]}, Abdelkader Essafi^{3[¶]}, Jennifer E. Huffman^{3[¶]}, Caroline Hayward^{3[¶]}, Ana Knežević², Jayesh J. Kattla^{4,5}, Ozren Polašek^{6,7}, Olga Gornik², Veronique Vitart³, Jodie L. Abrahams^{4,5}, Maja Pučić¹, Mislav Novokmet¹, Irma Redžić², Susan Campbell³, Sarah H. Wild⁸, Fran Borovečki⁷, Wei Wang^{9,10,11}, Ivana Kolčić⁷, Lina Zgaga⁷, Ulf Gyllensten¹², James F. Wilson^{8[¶]}, Alan F. Wright^{3[¶]}, Nicholas D. Hastie^{3[¶]}, Harry Campbell^{8[¶]}, Pauline M. Rudd^{4,5[¶]}, Igor Rudan^{8,11[¶]*}

Loci Associated with *N*-Glycosylation of Human Immunoglobulin G Show Pleiotropy with Autoimmune Diseases and Haematological Cancers

Gordan Lauc^{1,2}[✉], Jennifer E. Huffman³[✉], Maja Pučić¹[✉], Lina Zgaga^{4,5}[✉], Barbara Adamczyk⁶[✉], Ana Mužinić¹, Mislav Novokmet¹, Ozren Polašek⁷, Olga Gornik², Jasminka Krištic¹, Toma Keser², Veronique Vitart³, Blanca Scheijen⁸, Hae-Won Uh^{9,10}, Mariam Molokhia¹¹, Alan Leslie Patrick¹², Paul McKeigue⁴, Ivana Kolčić⁷, Ivan Krešimir Lukić⁷, Olivia Swann⁴, Frank N. van Leeuwen⁸, L. Renee Ruhaak¹³, Jeanine J. Houwing-Duistermaat⁹, P. Eline Slagboom^{10,14}, Marian Beekman^{10,14}, Anton J. M. de Craen¹⁵, André M. Deelder¹⁶, Qiang Zeng¹⁷, Wei Wang^{18,19,20}, Nicholas D. Hastie³, Ulf Gyllensten²¹, James F. Wilson⁴, Manfred Wuhrer¹⁶, Alan F. Wright³, Pauline M. Rudd⁶[†], Caroline Hayward³[†], Yurii Aulchenko^{4,22}[†], Harry Campbell⁴[†], Igor Rudan⁴[†]*



The first human study linking glycome with epigenetics

Epigenetics 7:2, 164-172; February 2012; © 2012 Landes Bioscience

Epigenetic silencing of *HNF1A* associates with changes in the composition of the human plasma *N*-glycome

Vlatka Zoldoš,^{1,†} Tomislav Horvat,^{1,†} Mislav Novokmet,² Cyrille Cuenin,³ Ana Mužinić,² Maja Pučić,² Jennifer E. Huffman,⁴ Olga Gornik,⁵ Ozren Polašek,⁶ Harry Campbell,⁷ Caroline Hayward,⁸ Alan F. Wright,⁸ Igor Rudan,^{6,7} Katharine Owen,^{8,9} Mark I. McCarthy,⁸⁻¹⁰ Zdenko Herceg^{3,*} and Gordan Lauc^{2,5,*}



Academia or industry?

