

International Conference on the Bioscience of Lipids



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NEWSLETTER 2010

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THE 50th ICBL

REGENSBURG, GERMANY, SEPTEMBER 1-5, 2009

“Regensburg, the Free Imperial City and 50th ICBL host”

The Conference venue, at Kolpinghaus, was located in the heart of the medieval city, close to the Saint Peter gothic cathedral and the medieval stone bridge over the Danube River, with everything needed by an ICBLian at walking distance. The medieval city, a UNESCO World Heritage Site, which has successively been Radasbona for the Celts and Castra Regina for the first Roman settlers, was then left free to the delegates who could ramble at their own convenience.

The welcome address opening the Conference underlined the high aims of ICBL, which started 56 years ago with its 50th anniversary in Regensburg. ICBL is a leading Conference for “fundamental investigations in all aspects of lipid research and related applications”, as pointed out in its mission statement. Faithful to its strong tradition of social activities emphasizing the lipid science, the opening Van Deenen Lecture was followed by a highly interactive buffet where the Conference delegates enjoyed Bavarian beer and German wine.

The second day was concluded by a memorable reception at the Old City Hall of Regensburg, a baroque building which was the permanent seat of the Reichstag, Perpetual Imperial Diet, of the Holy Roman Empire from the 17th to early 19th century. Following the welcome address by the Deputy Mayor, having a dialogue with the Chairman of the Conference, Prof. Dr. Gerd Schmitz, a gorgeous buffet was served in the adjacent rooms where the attendees benefited once more from the Bavarian hospitality.

The highlight of the Conference was the Friday afternoon excursion which ended with the Conference Dinner. This tour started with a bus transfer from the city to a small harbor at the Danube River through a peaceful countryside. Then, a quite relaxing boat trip to the "Kloster Weltenburg" Monastery, through unexpected sinuous gorges, the so-called "Weltenburg Narrows", with remarkable figures in the limestone, allowed the delegates to slow down their pace and enjoy the peace of the place. A short walk along the river led us to the locality where we had a guided visit of the Benedictine abbey, dedicated to Saint George, built and decorated by the Asam brothers in the early 18th century. The delegates were then left free to ramble around or taste the local beer brewed by the monks, before an equally quiet journey took us back to the City of Regensburg.

The Conference Dinner, held in a charming place of Neutraubling, a suburb of Regensburg, became a special event with the 50th Jubilee Speech delivered by the former President of the ICBL, Prof. Dr. Fritz Spener. This special speech (see the integral version in the Newsletter 2010) described the evolution of lipid bioscience, pointing out the different milestones which marked its development. This speech especially emphasized the role of outstanding lipid scientists who served that evolution and was presented as a legacy to young researchers in the field with encouragements to pursue the endless task for the benefit of mankind. As a response to this remarkable speech, the current President, Prof. Dr. Michel Lagarde, predicted a great future for the ICBL if a good balance between science and true social relationships is kept within the ICBLian community. He pointed out that the quality of the transmission process described in the Jubilee Speech will greatly be facilitated if we remember that, according to the French philosopher, medical scientist and gourmet François Rabelais, "science sans conscience n'est que ruine de l'âme". This was traditionally followed by celebrating the "Spirit of ICBL", all ICBLians standing up with a glass of wine or beer (water is not advised), dedicating their toast to the "Spirit of ICBL".

The Conference Dinner also included the presentation of poster awards, celebrating the young generation in action. This is the most scientific part of the event, which reminds us to the close relationship between science and social activities, and highlights the contribution of young scientists to the Conference.

All along the dinner buffet, an excellent small orchestra entertained the delegates with various musical themes, sometimes accompanied with songs performed with high quality by a young lady. At the end of the dinner time, some delegates led by local scientists and music enthusiasts sketched dance steps in cheerfulness.

Besides these common social events, the accompanying persons had additional activities on Wednesday and Thursday mornings. They first walked through the medieval city to see the most famous places such as the cathedral square with its impressive gothic spiritual monument decorated on facades with kings on horseback, foolish virgins and various animal and human faces. They could see also the peculiar mansions built by the rich patrician families who traded with other European cities and showed their wealth through big houses highlighted by towers such as the famous Golden Tower. The tour ended by crossing the Danube onto the stone bridge built in the 12th century, from which the old city can be contemplated. The next morning was dedicated to the visit of Saint Emmeran Church, part of a former monastery, which became a royal residence in the baroque style decorated by the famous Asam brothers at the 18th century. Close to that church, visitors found the "Thurn and Taxis" palace or castle. Part of this building became a highly ranked carriage museum with an interesting collection of coaches and stable for horses.

On Saturday afternoon on closing, delegates had the opportunity to look forward to and dream of Bilbao when the Chairman of the 51th ICBL, Prof. Dr. Felix Goni, showed selected views of the biggest Basque Country city with the avant-garde architecture of the Guggenheim Museum, and the appealing scientific pre-program of the next Conference.

With my very best wishes.

Michel Lagarde
President of ICBL

The Poster Awards of the 50th ICBL
“Back to the Future”

In the Stadthalle of Neutraubling the traditional Conference Dinner of the ICBL 2009 took place which also included the ICBL Poster Award ceremony. After the look back of Fritz Spener to the history and the development of ICBL at the occasion of the 50th Anniversary of this conference series, Guenther Daum, the chairman of the Poster Award Jury took participants back to the future. He pointed out that contributions of PhD students and young Post-Docs to the ICBL are very important. For some of these participants it was the first time to present their most recent data to experts in the field of lipid research and to discuss their studies among each other in an international meeting. ICBL very much hopes to attract these young scientists to become regular participants of this conference in the future and to continue their investigations in the lipid field.

Members of the ICBL 2009 Poster Award Jury were: Guenther Daum (chairman), Graz University of Technology, Austria; Yasuyuki Igarashi, Hokkaido University, Sapporo, Japan; Peter Slotte, Åbo Akademi, Turku, Finland; Laszlo Vigh, Hungarian Academy of Sciences, Szeged, Hungary; and Charalampos Aslanidis, Gerhard Liebisch and Josef Ecker from the University of Regensburg, Germany. Among the 82 posters which were presented at the ICBL 2009 in Regensburg, in a first round of pre-selection 26 poster contributions were nominated based on the outstanding quality of the abstracts. These pre-selected posters were more closely inspected by the members of the Poster Award Jury at the conference location. Criteria at this point were of course relevance of the topic, originality of the subject, but also the quality of the presentation and the visual appearance. In his Award presentation, Guenther Daum pointed out the excellent performance of all the nominees in the Poster sessions and thanked the organizers of this conference for sponsoring the money for three Poster Awards which were considered equal. Finally, Guenther Daum named the winners of the ICBL 2009 Poster Awards. This time, three young ladies from Japan and Germany won the award. This result nicely reflected the great appearance of Japanese participants at the ICBL in Regensburg and was at the same time a tribute to the host country. The abstracts of the winning posters are shown below. The ICBL community is proud of these outstanding presentations, congratulates the winners and hopes that also in future meetings young attendants will be as active as at the 2009 ICBL in Regensburg.

The winners of the 2009 ICBL Poster Awards were:

PO 17

Microsomal prostaglandin E synthase-1 (mPGES-1) deficiency suppresses chemical carcinogen-induced colon carcinogenesis

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Microsomal prostaglandin E synthase-1 (mPGES-1) is a stimulus-inducible enzyme that functions downstream of COX-2 in the PGE₂-biosynthetic pathway. Accumulating evidence indicates that COX-2-derived PGE₂ participates in the development of various tumors, but the involvement of mPGES-1 in carcinogenesis has not yet fully understood. Here, we

investigated the effect of mPGES-1 efficiency on chemical carcinogen-induced colon carcinogenesis. mPGES-1 knockout (KO) and wild-type (WT) mice on Balb/c background were intraperitoneally injected with carcinogen azoxymethane (AOM) once weekly for 6 weeks and the animals were sacrificed 6 and 18 weeks after the last injection. At 6 weeks after the injection, the number of aberrant crypt foci (ACF) was significantly reduced in mPGES-1 KO mice compared to WT mice. We further found that mPGES-1 deficiency significantly reduced both total number and size of polyps in colon at 18 weeks after the injection. Decrease in the incidence rate of adenocarcinoma in KO mice was confirmed by histological analysis. Immunohistochemical analysis revealed that mPGES-1 was induced and β -catenin was highly expressed and frequently translocated into the nucleus in adenoma of WT mice. PGE₂ levels in colon tumor tissues of mPGES-1 KO mice were significantly lower than those in WT mice, whereas PGD₂ and 6-ketoPGF_{1 α} levels were higher. 15-deoxy- $\Delta^{12,14}$ -PGJ₂, a metabolite of PGD₂, is known to suppress carcinogenesis by PPAR γ activation or NF κ -B inhibition. These results indicated that mPGES-1 deficiency not only reduced PGE₂ generation but also enhance the production of another prostanoid, and that both of them might be involved in suppression of colon carcinogenesis.

PO 43

Ceramide synthase 3 and the biosynthesis of sphingolipids with very long chain fatty acids

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The structural diversity of sphingolipids is the pre-requisite for their functional specialization in different tissues or cell types. The fatty acid moiety with its different chain length and various degrees of saturation, hydroxylation, and esterification contributes significantly to this structural complexity. Sphingolipids containing very long chain fatty acids (VLCFAs), with a hydrocarbon chain longer than 26 carbon atoms, are fundamental components of skin and testis. In testis, polyunsaturated fatty acid (PUFAs) moieties (4 to 6 double bonds) are found in sphingolipids of differentiated germ cells and play an essential role in male fertility, while in skin sphingolipids with ω -hydroxylated VLCFA-moieties are important for the proper function of the epidermal barrier. The condensation of specific activated fatty acids with a sphingoid base, yielding (dihydro)ceramides, is catalyzed by enzymes of the ceramide synthase (CerS) family. Previously, we have linked the condensation with very long chain PUFAs to ceramide synthase 3, which is specifically expressed in skin and testis. Currently, we have established a non-radioactive enzymatic assay and can demonstrate that acyl-CoAs with more than 26 carbon atoms in length are substrates of CerS3, but not of CerS2. In conclusion, ceramide synthase 3 is an essential regulatory enzyme in male fertility and skin homeostasis.

PO 45

The influence of ganglioside loss in the CNS on energy metabolism

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Gangliosides are plasma membrane components involved in regulating neuronal function in the CNS. Their essential role has been proven by the fact that a constitutive ganglioside knockout affecting the entire brain is lethal to newborn mice. To further investigate the role of gangliosides in neuronal function, we created an inducible neuron-specific ganglioside knockout model with selective inactivation of the key enzyme in ganglioside biosynthesis (UDP-glucose:ceramide glucosyltransferase (Ugcg)) under the control of the CaMKII α promoter in mouse forebrain. Upon tamoxifen induction, a prominent disturbance in energy homeostasis was observed. Knockout mice became obese upon normal chow feeding and showed a 2.25-fold weight increase compared to control mice at eight weeks after induction. Furthermore, *Ugcg*^{f/f//CamKCre} mice showed a significantly impaired thermogenic response (*Ugcg*^{f/f//CamKCre} 35.32 \pm 0.22°C, *Ugcg*^{f/f} 37.16 \pm 0.16°C) as well as an inappropriate hypometabolic response to energy overload. In addition to morphological changes in main thermogenic tissue, the interscapular brown adipose tissue (iBAT), we could show a markedly reduced sympathetic activity in *Ugcg*^{f/f//CamKCre} iBAT as determined by norepinephrine (NE) turnover measurements (*Ugcg*^{f/f//CamKCre} 0.38 \pm 0.11 ng NE*h⁻¹*tissue mg⁻¹, *Ugcg*^{f/f} 1.52 \pm 0.32 ng NE*h⁻¹*tissue mg⁻¹). Based on current results, we have indications that hypothalamic nuclei involved in energy regulation are specifically afflicted by the loss of gangliosides. In summary, these results suggest that gangliosides play a critical role in regulating neuronal feedback loops involved in energy homeostasis regulation and thus may lead to new insights into the prevention of obesity.

Guenther Daum
Vice President of ICBL

50th International Conference on the Bioscience of Lipids (ICBL)
Regensburg, Germany, September 1-5, 2009
Scientific Report

The 50th Jubilee ICBL was held in the Kolpinghaus in Regensburg. A total number of 235 scientists from 29 countries (6 continents) attended the meeting. There were 27 invited lectures, 23 short-oral communications and 84 poster presentations.

The theme of this year's ICBL was "Biological and regulatory functions of lipid molecular species". The program comprised 7 half-day sessions each dealing with specific topics related to this main theme. Following the opening ceremony on Tuesday evening, the **13th van Deenen Lecture** was given by **David Mangelsdorf** (Dallas, Texas), entitled "Nuclear receptors, FGFs and the regulation of nutrient metabolism". In this excellent lecture, Dr. Mangelsdorf described his research on nuclear receptors. Special focus was on the FGFs and their association with dietary factors.

Session 1 was devoted to "Membrane microdomain heterogeneity and signaling" and organized by **Tony Futerman (Rehovot) and Erich Gulbins (Essen)** (Chapel Hill NC, USA). **Peter Slotte** (Turku) reviewed our current knowledge on sphingolipids and the formation of sterol-enriched ordered membrane domains. **Toshihide Kobayashi (Hirosawa, Villeurbanne)** discussed and presented techniques for visualization of rafts while **Felix Goni** (Bilbao) talked about the biophysical properties and membrane organization of ceramides, ceramide-1-phosphate and other simple sphingolipids. **Erich Gulbins** (Essen) presentation described lipid rafts and their association with redox signaling. Finally, **Denis Corbeil** (Dresden) presented new insights into stem cell differentiation and its release of prominin-1/CD133+ lipid raft - membrane vesicles for transport of cargo from the Golgi to the cell surface.

The topic of **Session 2** "Functions of sterol molecular species" was chaired by **Robert Rawson** (Dallas, Texas) and **Antonio Moschetta** (Pescara). **Joachim Herz** (Dallas, Texas) reviewed the LDL receptor family, which represents mediators of signal transduction. **Emyr Lloyd Evans** (Cambridge) showed that inhibition of NPC1 function by cholesterol precursors in Smith-Lemli-Opitz Syndrome induces an intracellular phenotype identical to Niemann-Pick C disease. Then, **Gerd Schmitz** (Regensburg) presented genetic and environmental determinants of monocyte/macrophage lipid class and species alterations and **Robert Rawson** (Dallas, Texas) summarized the SREBP pathway in insects. Finally, **Antonio Moschetta** (Pescara) presented his research on cholesterol derivatives as signalling molecules regulating nuclear receptors and cell proliferation.

Session 3 "Metabolism and impact of molecular species from fatty acid classes", organised by **Günther Daum** (Graz) and **Ronald Wanders** (Amsterdam), started with a lecture by **Teymuraz Kurzchalia** (Dresden) on the requirement of branched-chain and long-chain fatty acids in *C. elegans*. **Ronald Wanders** (Amsterdam) outlined the peroxisomal disorders including Refsum's disease and its relation to the α - and ω -oxidation of phytanic acid. Particularly this session was comprised of several short oral presentations dealing with triacylglycerol lipases, adipocyte caveolin-1 lipid droplets, and new PPAR α / γ -ligands that improve lipid metabolism and reduce fat deposition in a mouse model of diet-induced obesity.

In **Session 4**, chaired by **Charles Serhan** (Boston, Massachusetts) and **Michel Lagarde** (Lyon), the various lectures dealt with eicosanoids and biological signaling. **Charles Serhan** showed his recent results on resolvins, which are activators of inflammation-resolution programs. **Takao Shimizu** (Tokyo) reviewed our current understanding of lipid mediators and their relation to glycerophospholipid metabolism. In the next contribution, **Ivo Feussner** (Göttingen) presented the current knowledge on evolutionary conserved signals in plants, mosses, fungi and bacteria, the oxylipins.

The third day of the conference started with **Session 5** on regulatory functions of glycerophospholipid and sphingolipid species organized by **Akio Kihara** (Hokkaido). **Akio Kihara** discussed the synthesis of very long-chain fatty acid and its relationship to sphingolipid metabolism. **Anthony H. Futerman** (Rehovot) delineated the complexities of sphingolipid synthesis. **Phillip Hawkins** (Cambridge) discussed recent results on PI3-kinases in inflammation. **Wouter Moolenaar** (Amsterdam) elucidated the regulation and biological activities of the autotaxin-LPA axis.

In the afternoon the traditional ICBL social program took place. This started with a boat trip through the scenically enchanting Danube Gorge to the Monastery "Kloster Weltenburg". The Benedictine Abbey of Weltenburg founded in 600 A.D. on a scenic peninsula stretching in the Danube is a true masterpiece of Baroque art built by the Asam brothers. In front of the church there is one of the most beautiful Bavarian "Biergarten" with its famous beer produced by the monks, in the oldest monastery brewery in the world. In the evening the gala dinner took place and Fritz Spener (Graz) presented his Jubilee Speech denoted "ICBL and the evolution of lipid bioscience".

Session 6 "Lipotoxicity and phospholipidosis" was organised by **James A. Shayman** (Ann Arbor, Michigan) and **Ira Goldberg** (New York). **James A. Shayman** reviewed the function of lysosomal phospholipase A2 and its relation to phospholipidosis. The second lecture was devoted to ceramides, insulin resistance, and metabolic disease and presented by **Scott A. Summers** (Salt Lake City, Utah). **Ira Goldberg** presented the role of lipid in the heart, where they function as a source of fuel and a source of toxins.

The final **Session 7** covered lipid barrier function and was chaired by **Dennis Voelker** (Denver, Colorado) and **Peter Krieg** (Heidelberg). **Dennis Voelker** started out with the anti-inflammatory and anti-viral properties of phosphatidylglycerol in lung surfactant. Thereafter, **Joke Bouwstra** (Leiden) described the skin barrier in healthy and diseased state. **Peter Krieg** (Heidelberg) showed that a novel eicosanoid pathway is essential for the epidermal barrier function and its relation to congenital ichthyosis and 12R-lipoxygenase deficient mice and finally **Evelyn Orso** (Regensburg) gave a presentation on the triple function of the ABC transporter ABCA3 in the secretion of lung surfactant lamellar bodies, milk fat globules and platelet granules.

During the closing ceremony the awards for short-oral communications were presented. The awards for the best posters already had been presented during the conference dinner.

Oral Communication Awards:

SO 6

Triacylglycerol lipases of yeast and plants: More than just hydrolases

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In the yeast, mobilization of triacylglycerols (TAG) is facilitated by *TGL3*, *TGL4* and *TGL5* gene products. Interestingly, experiments using [³²P] orthophosphate as a precursor for complex glycerophospholipids revealed that *tgl* mutants had a lower steady-state level of these membrane lipids. To understand a possible link between TAG lipolysis and phospholipid metabolism, we performed overexpression studies with *Tgl3p* and *Tgl5p* which clearly demonstrated that these two enzymes enhanced the level of phospholipids. Domains and motifs search analyses indicated that yeast TAG hydrolases possess a GX SXG lipase motif but also a HX₄D acyltransferase motif. Purified *Tgl3p* and *Tgl5p* did not only exhibit TAG lipase activity but also catalyzed acyl-CoA dependent acylation of lyso-phosphatidylethanolamine and lyso-phosphatidic acid (LPA), respectively. Search for lipase/hydrolase homologues in the *Arabidopsis thaliana* genome led to the identification of At4g24160 which possess three motifs that are conserved across the plant species such as GX SXG

motif, a HX₄D motif and a probable lipid binding motif V(X)₃HGF. Characterization of At4g24160 expressed in bacteria revealed that the presence of an acyl-CoA dependent LPA acyltransferase activity. In addition, the purified recombinant At4g24160 protein hydrolyzed both TAG and phosphatidylcholine. We hypothesize that the plant enzyme may be involved in membrane repair. In summary, our results indicate that these TAG lipases play a dual role and thereby contribute to both anabolic and catabolic processes in yeast and plants.

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SO 15

A role for SCT1/GAT2 in acyl chain remodeling of phosphatidylcholine

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Phosphatidylcholine (PC) is the major bilayer-forming phospholipid in eukaryotes. The PC species profile, i.e. the ensemble of PC molecules with acyl chains differing in length and saturation, is crucial for the fluidity and thickness of eukaryotic membranes. In *S. cerevisiae*, species-selective biosynthesis and remodeling by acyl chain exchange contribute to the PC species profile (1). A *pct1* strain, in which the CDP-choline biosynthesis route is inactivated, obtains its steady state PC species profile by acyl chain exchange of the PC pool synthesized by methylation of phosphatidylethanolamine. Remodeling involves hydrolysis of one or both acyl chains by a phospholipase followed by a reacylation catalyzed by an acylCoA-dependent acyltransferase. Alternatively, remodeling could occur via transacylase-catalyzed mechanisms.

In a database search for enzymes that may catalyze these reactions, we identified 120 candidate genes. The corresponding deletion strains were obtained, and double mutants with an additional knockout of the *PCT1* gene were produced. The most promising candidates were selected in a screen of the PC species composition using ESI-MS/MS. Here we report on the evolution of the species profile of newly synthesized PC in the *pct1* knockout, the double knockout and the overexpression strain for one of the candidate genes, *SCT1*. The *SCT1* (*GAT2*) gene encodes an acyltransferase that catalyzes the synthesis of lysophosphatidic acid. We show that it also plays a role in PC remodeling.

1. Boumann, H. A. et al. (2003). The two biosynthetic routes leading to phosphatidylcholine in yeast produce different sets of molecular species. Evidence for lipid remodeling. *Biochemistry* 42: 3054-9.

The abstracts of the invited lectures, short oral communications and poster presentations have been published in *Chem Phys Lipids* 160 (Supplement), August 2009.

Gerd Schmitz

On behalf of the Organizing Committee ICBL 2009

50th ICBL, Regensburg, Germany, 1-5 September 2009
Friedrich Spener
Department of Molecular Biosciences, University of Graz, Austria
Jubilee Speech
ICBL and the Evolution of Lipid Bioscience

Ladies and Gentlemen, dear Colleagues and Friends,

A highlight of this year is the 200th anniversary of the birth of *Charles Darwin*, who published his provocative book “The Origin of Species” in 1859. This book and his follow-up publications decisively influenced the thinking of society as a whole. We, the lipid scientists and their friends here in Regensburg celebrate now the event of the 50th International Conference on the Bioscience of Lipids. We did not change the world, but we contributed with new discoveries to the benefit of mankind. It was the idea of the Steering Committee to highlight ICBL and lipidology with a Jubilee Speech. Presenting such views is a novelty for me. These views are, by nature, not always unbiased.

The “Origin of Species” was preceded by an “Origin of Life” – and that’s where lipids came in first. Their self-organisation in the aqueous phase is attained by a huge entropic contribution, enabling the formation of membranes, a.k.a. biomembranes. Surrounding an aqueous volume such biomembranes form cells, the smallest living units. In eukaryotes even this space is divided by biomembranes into more subspaces, called organelles. *Christian de Duve* from New York very early recognized the importance of such organelles, in particular peroxisomes and lysosomes for maintaining cellular lipid metabolism; for this he was awarded the Nobel Prize in Medicine in 1974. In a nutshell, without the invention of lipids no life would have been possible on earth.

In 1972 *Singer* and *Nicolson* published a paper, entitled “The fluid–mosaic model of the structure of cell membranes”. The salient feature of this model is that biomembrane lipids, composed of phospholipids, cholesterol and (glyco)sphingolipids are in a liquid-crystalline state. Further, “peripheric” and membrane-spanning “integral” proteins “float in a sea of lipids”.

This is the time to refer to *Laurens van Deenen*. His activities were multifold, he was the 4th President of ICBL, serving 4 years from 1978 to 1981, and was affiliated with BBA for 32 years where he became eventually Editor-in-Chief. He had also a pitch for the spectacular. In his lectures he showed slides with graphs and letters in white against a dark-blue background – simply beautiful as compared to the bread and butter black and white slides then. A whole generation, including me, followed suit until powerpoint technology took over.

Scientifically, in the nineteen seventies and eighties *van Deenen* and his group at Utrecht University developed pioneering methods to synthesize molecular species of biomembrane phospholipids, to analyze them by physico-chemical methods, and to assess biomembrane fluidity and curvature; moreover, first arguments were provided that the sea of biomembrane lipids is not an unstructured assembly of lipid molecules.

Clearly, we had learnt since that lipids in biomembranes are not merely sitting there, to the contrary they are involved in signalling and transport – certain lipid species even form microdomains or rafts together with specialized proteins. Understanding detailed structure and function of microdomains is a topical, if not still controversial issue to date. None the less, the basic features of *Singer's* and *Nicolson's* model are still valid. They would have deserved the Nobel Prize for providing this pioneering, new knowledge at that time. This alludes to one message of my talk: Lipid bioscience and their disciples have not yet managed to attain full recognition for their contributions to scientific progress in the life sciences.

One early and probably first initiative to get lipid research off its infancy on a broader scale, was taken by *Romain Ruysen*, who assembled 88 scientists from Europe and the United States - called "our Founding Fathers" - in June 1953 in Brussels. Among them were *Christian de Duve* and *Konrad Bloch*, two future Nobel Laureates. The aim was to discuss post-WWII developments relating to the chemistry and biochemistry of lipids, including nutritional aspects. These three areas were typical for thinking lipids then, as chemistry, in particular natural products chemistry was still dominant in our field. A historical flash back reveals that lipid chemistry and biochemistry was introduced in 1811 by *Michel Eugène Chevreul* in Paris who started to work with animal fats. We, the lipid community, owe him high esteem for coining names like "stearine", "cholestérine", "glycérine", "margarin" et cetera. In the almost mythical age of 102 this great scientist died in 1889. Further proof to dominance of chemistry were the Nobel prizes in Chemistry given in 1927 and 1928 to *Heinrich Wieland* and *Adolf Windaus*, respectively, for their structural investigations on prenol and sterol compounds. Of course enzymes of lipid metabolism, in particular lipases, slowly came into focus. Important for nutrition, the concept of "essential fatty acids" was formulated 1929 by *Burr and Burr* in Minneapolis, propelling polyunsaturated fatty acids into the limelight.

The title of the 1953 Brussels conference was "Colloquium on Biochemical Problems of Lipids". So successful was that meeting that a second similar one was convened in Ghent 1955. And when a third meeting was held in Brussels in 1956 it was decided to name it the "3rd International Conference on the Biochemistry of Lipids", a name that stuck until 2001 when it was changed to "International Conference on the Bioscience of Lipids" to appreciate substantial broadening of methods and themes in lipid research. Luckily, the trademark acronym "ICBL" still sticks.

It is particularly noteworthy that *Konrad Bloch* from Cambridge, MA, who gave a lecture at the 1st conference in 1953 on the biosynthesis of cholesterol, was awarded the Nobel Prize in Medicine for his studies on cholesterol in 1964. He lectured in a number of our conferences and stayed on as Advisory Member in our Steering Committee until his death in 2000. A further highlight in 1964 was the Nobel Prize for *Feodor Lynen* from Munich for discovering the mechanism and regulation of fatty acid metabolism. Another great progress, made mainly in the fifties and sixties in the laboratory of *Eugene Kennedy* in Cambridge, MA, was the elucidation of primary lipid metabolism in mammalian and microbial cells. This achievement cannot be over-estimated, and regrettably, such message did not reach the Nobel committee.

At the 1960 ICBL in Marseille a kind of Advisory Board elected *Romain Ruysen* the 1st President of ICBL. In Noordwijk 1965, ICBL established a Steering Committee with a formal constitution, stressing that ICBL is not a legal body – which holds until today, and *Alistair Frazer* was elected 2nd President of ICBL. *Frazer* was quite a character, he was mainly concerned with digestion and absorption of lipids and heavily championed at the 1962 ICBL in Birmingham a ‘particulate mechanism’ for absorption of triglycerides. This was at variance with the view of *Bengt Borgström* from Lund, another pioneer of lipid absorption, who favored micelles formed by pancreatic lipase action on triglycerides prior to absorption. The matter was finally resolved at the conference when micelles were accepted as being very small particles.

I personally profited from this controversy. The theme of my Ph.D. thesis, which I carried out at the University of Graz, was to check whether a particulate mechanism can be ruled out. The answer was yes, my data fully supported the concept of *Bengt Borgström*. Apart from my Ph.D. commencement to I was happy to get two papers published in 1968, the first one in the Lipid-section of BBA, the other one in Chemistry and Physics of Lipids. Authors of the first paper were *Fritz Spener*, *Fritz Paltauf* and *Anton Holasek*. The latter was Head of the Department and attracted ambitious collaborators, but also huge financial support. *Fritz Paltauf* was ‘Assistent’ – in the German speaking world the equivalent to Assistant Professor – and my direct supervisor. When I inquired about the sequence of authors, he replied: “Look, the first author is the chap working at the lab bench, the last author is the boss of the Department, and it is the one in the middle who really understands the scientific problem.

Having referred to journals devoted to lipids let me say that I published my third paper in 1969 together with *Helmut Mangold*, my postdoctoral mentor at the Hormel Institute of the University of Minnesota, in the Journal of Lipid Research. The evolution of journals solely devoted to lipid research was not by chance, it was triggered by a dramatic improvement of analytical methods to separate lipids then. In particular lipid extraction, thin layer chromatography, and gas-chromatography; the latter brought along, among others, by *Toni James*, later the 3rd ICBL President from 1970 to 1977. And not to the least mass-spectrometry, in particular applied to sphingolipids, pheromones and prostaglandins came into the lipid world.

Back in 1929 *Burr* and *Burr* correctly tagged essentiality of linoleic acid, an n-6 fatty acid, to maintaining the barrier function of skin for water exchange. In 1957 *Hugh Sinclair*, a renowned nutritionist and champion of polyunsaturated fatty acids, organized the 4th ICBL in Oxford solely devoted to essential fatty acids. In fact, his prescience and enthusiasm put PUFAs “on the map” and on many ICBL programs since. In the sixties it was still a question whether or not n-3 PUFAs are essential as proven for n-6 PUFAs; this puzzle was solved with the discovery of prostaglandins originating from both n-6 and n-3 PUFAs, respectively. The latter theme was dealt with at the 1963 ICBL convened by *Sune Bergström* in Stockholm, and at the Nyborg ICBL 1981, organized by *Erik Aas-Jørgensen* and *Jens Knudsen*. Having attended the Nyborg conference with my group, I can share with you four remarkable things: (1) We were the only group camping, (2) Jens complained about some invited big shots from overseas, flying in for the talk and flying out next day already, (3) my group including me were astonished seeing *Bob Ockner* from San Francisco, the icon for FABP

people, for the first time live, how young and fresh-looking he was, and (4) next year *Sune Bergström*, *Bengt Samuelson* and *John Vane* became Nobel Laureates for their work on prostaglandins and related substances.

Another popular area at that time have been ether lipids whose biosynthesis was unravelled by *Fred Snyder* from Oak Ridge. It was moving to see Fred again at the 1997 ICBL in Assisi, recounting the ether lipid story in his *Laurens van Deenen* opening lecture. Such opening feature by a distinguished speaker was introduced by *Albert Lagrou*, organizer of the Antwerp ICBL 1996, in honour of *Laurens van Deenen* who had passed away two years before.

There was a time in the nineteen seventies and eighties where progress in knew knowledge in plant lipid metabolism was ahead of that made in the mammalian and microbial fields. Interestingly, “big industry” heavily moves the field as well. Today, Dupont and BASF race for production of very long-chain PUFAs in transgenic oilseeds. What has been achieved already is a fantastic highlight in basic research made possible by cooperation of academia and industry.

Once I formulated in a debate that “there is no lipid without a binding protein”. Today I would be more cautious, but still believe that without binding or transport proteins regulation of lipid homeostasis would not be as efficient as it is. These proteins became really popular in the seventieth. In general they were excellent gadgets for applying protein biochemistry, molecular biology and binding studies including high-tech biophysical approaches. But function, the most important aspect, was hard to come by. I remember *Jeffrey Gordon* from St. Louis, MO, titling his 1987 review in *Annual Reviews of Nutrition* “The metabolic significance of fatty acid binding proteins, abundant proteins in search of a function”. Well, in the mean time we are happy to find some of these intracellular lipid binding proteins in the nucleus affecting gene-regulation. Clearly, lipid binding proteins are often on the agenda of ICBLs, and will be so in the future as new binding proteins are still being discovered, the most recent being those for sphingolipids.

In the fields of medical and clinical lipid research prevalent topics in ICBL programs related to lipoproteins and atherosclerosis, and to glycosphingolipidoses up to the nineteen nineties. Our colleagues from Milan, headed by *Rodolfo Paoletti*, were the big promoters of lipoprotein research. *Paoletti*, over many years Advisory Member in our Steering Committee, convinced the Italian Nutrition Foundation to host our ICBL secretariat and archive in Milan for more than 30 years by now. This fortunate link provided funds to *Giovanni Galli*, and after his death to his widow *Marzia Galli Kienle* for running so successfully this Secretariat.

We older ones are still aware of the dramatic progress attained in understanding lipoprotein composition, structure and metabolism. But two single achievements stood out: Firstly, the definition of serum lipoprotein parameters for good use in clinical diagnostics and therapy, and secondly, unravelling the feed-back regulation of cholesterol transport and metabolism by *Michael Brown* and *Joseph Goldstein* from Dallas, who became Nobel Laureates in 1985. I would bestow upon them a second Nobel Prize, though, for deciphering in the nineties

cholesterol regulation via SREBPs and SCAP. We had the pleasure to listen to these latter novelties at a lecture given by *Michael Brown* at the 1995 ICBL in Washington, DC.

In the last 20 years diabetes and obesity more and more came into focus of preclinical and clinical research, concomitantly with the recognition of adipocytes as dynamic cells of the body. By the same token at subcellular level, lipid droplets have been recognized only very recently to be dynamic organelles. Clearly, these topics have entered ICBLs' recent agendas, including this one here in Regensburg. To this end, future challenges for lipidologists in the mammalian field will be lipid-associated diseases, including those affecting brain and the CNS; and the link of lipid-associated diseases to the immune system.

Edward Dennis from San Diego formulated in 2003 "Lipids are in many ways the most important of the biomolecules because they are the ultimate controllers and regulators of our bodily processes; they are key to signalling events in cells". Beyond all the fine structures of lipid signalling molecules, I am still thrilled by structures as simple as fatty acids being able to signal to the nucleus, thereby affecting gene regulation. Key to understand this property was certainly the discovery of *Stephen Green* from London and *Walter Wahli* from Lausanne at the start of the ninetieth that some drugs and fatty acids are ligands for transcription factor PPAR. This started a completely new dimension in lipid research by elucidating many more links between lipids and gene regulation. Moreover, it provided an optimal lead for drug development to combat lipid-associated diseases. It is my strong believe that a Nobel Prize should credit such hallmark discoveries.

I referred already to the giant leap in progress brought upon by methods like TLC and GC. Of course, lipidologists had to learn protein biochemistry, then to broaden the experimental repertoire to molecular and cell biology, cloning, knock-out and -in technology and so on. Also, we had to familiarize ourselves with high though-put technology like genomics and proteomics. And finally, we arrive now at lipidomics. This holistic approach was made possible by dramatic methodological improvements in HPLC and mass spectrometry, NMR, imaging, all accompanied by bioinformatics for data handling and storage. I foresee a further surge in new knowledge based on interlinked data on the genome, proteome and lipidome of a cell, tissue and body fluid, pinpointing molecular levels now to lipid molecular species as well.

The burst in new methods and availability of ever more-sophisticated instruments translated into dramatic broadening of the lipid agenda. And it impacted ICBL not only in terms of the topics dealt with, but also the self-understanding of ICBLs' Steering Committees. Under *Alan Garton* from Aberdeen, our 5th President from 1982 to 1989, we celebrated the 25th ICBL with a Silver Jubilee Booklet. The next President was *Albert Lagrou* from 1990 to 1997 and I wish to state that under Alan's and Albert's presidencies, organizing an ICBL evolved into an art. Within the traditional 3-day format not only scientific agenda mattered, but also the half-day off had to be filled with cultural events characteristic for each venue's region. All this led to the now famous and traditional "spirit off ICBL", originally formulated by *Alan*. He became the high-priest celebrating this "spirit" as long as his fragile health allowed for it. Thereafter it became the privilege of the President to invoke the "Spirit of ICBL" at the conference dinner.

Well, “tempora mutantur et nos in illis” and I guess, my two predecessors were looking for changes. So I was elected the 7th President of ICBL to serve from 1998 to 2004. In the Steering Committee we initiated changes by broadening the scope from Lipid Biochemistry to Lipid Bioscience in a 4-day format by keeping the traditional half day off for cultural events. Another important reform, also of the presidency of my successor *Michel Lagarde*, was to shorten stewardships in the Steering Committee from 4 to 3 years, and to abolish re-elections. All this adds up to a fine turnover within the Steering Committee, despite increase of corresponding member positions to take care of increased globalization. The latter word brings up the last, but not the least aspect - that ICBL goes overseas from time to time: We have been in Jerusalem 1967, in Tokyo 1988. The latter became not only a seeding event for the founding of the “Japanese Conference on the Biochemistry of Lipids”, but also a tradition to have a strong participation of our Japanese colleagues at our ICBLs I am glad to state. In 1995 we went to Washington, DC, and in 2012 we will be in the new world again.

In 2003, on the occasion of its 50th anniversary, ICBL published the Golden Jubilee Booklet that was edited by *Michel Lagarde*. I acknowledge with gratitude this fine source for my Jubilee Speech.

Let me close by saying that it is thrilling and challenging to be part of the lipid research community. We have all reasons to believe in and to hope for excellent perspectives in lipid bioscience and for the future of ICBL. But we must spread our gospel clearly in the scientific community.

My best wishes to all of you for a bright future, and thanks and congratulations to *Gerd Schmitz* and his team for arranging the 50th ICBL in Regensburg.

Thank you.

51st International Conference on the Bioscience of Lipids
September 7-11, 2010
Bilbao, Basque Country, Spain



Preliminary Conference Program of the 51st ICBL in 2010

Tuesday, September 7, 2010

14th Laurens van Deenen Lecture

Bill Dowhan (USA)

Dissecting the molecular basis for lipid diversity

Wednesday, September 8, 2010

Session 1: Physical chemistry of lipids

Session 2: Lipids and biomembranes

Thursday, September 9, 2010

Session 3: Bioactive lipids and lipidomics

Session 4: Lipid-protein interactions and lipid trafficking

Friday, September 10, 2010

Session 5: Lipid-binding proteins

Saturday, September 11, 2010

Session 6: Lipids in health and disease

Session 7: Plant lipids

Closing Lecture: Type II fatty acid synthase in Gram-positive bacteria (D. de Mendoza, Argentina)

Last update: February, 5, 2010

Venue

Bilbao, Spain

Bilbao's old municipal wine storage facility, or Alhóndiga (<http://www.alhondigabilbao.com/ingl/home.htm>), is a historical building at the heart of a city, which is undergoing has been just refurbished to produce a multi-disciplinary space open to all residents, geared towards knowledge, wellness and entertainment. This conference center is only a few minutes' walk from the Hotel Ercilla (where most participants are expected to stay) and from most of the city's main business and communications facilities, with access to the public transport system – metro, bus and tram – an underground parking lot and all manner of urban services and amenities.

Local Organizers

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**Future Meeting
52nd ICBL Warsaw, Poland
August 30-September 3, 2011**



Venue

University Campus Warsaw, Poland

Local Organizers

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Main theme of the conference

Expanding Horizons of Lipidomics

Preliminary Scientific Programme

- lipids in molecular medicine
- lipids in regulation of gene expression
- lipids in signaling and intracellular trafficking
- membrane microdomains, lipid binding proteins and membrane repair
- lipid modifications of macromolecules
- isoprenoid lipids
- lipid-protein interactions

**Marzia Galli Kienle and Maurizio Crestani
Secretary ICBL Steering Committee**