

## Details of the Dinner and Tributes October 16, 2003 to Honor Torvard Laurent

Vince Hascall (Co-organizer, HA2003) welcomed the guests and paid tribute to the people who were responsible for organizing the meeting: Kathy Vulkovich from his staff and Lisa Politi-Wilk and Melody Dian from the Cleveland Clinic Continuing Medical Education Department. He also acknowledged the contribution of the staff of the Matrix Biology Institute: Jennifer Mayser, Raquel West, Mary Alcott and Joanne Caha. Vince Hascall then introduced Janet "Jenti" Denlinger, who acted as mistress of ceremonies for the rest of the evening.



Jenti Denlinger (President, Matrix Biology Institute) welcomed the audience to the celebration of Torvard Laurent's contributions to hyaluronan research. Torvard, his wife Ulla and his numerous students have contributed more than anyone else in the past five decades to the knowledge of this molecule. She reminded the audience that Doctor Portes in France in the 1880s was the first who gave this molecule a specific name, "hyalo-mucin" because it was prepared from the vitreous (in Greek, "hyalos", glass-like) of the eye. With this name he intended to differentiate it from other mucins (epithelial secretions) that do not precipitate by acidification in the native environment, while hyaluronan does (forming the so-called "mucin clot").

Jenti reported to the audience that 314 participants were registered at the meeting - 152 from the USA and 162 from abroad. There were 170 posters. Then she introduced, in sequence, Bob Fraser, Fred Bettelheim, Glyn Phillips, Bryan Toole and Endre "Bandi" Balazs as the speakers of the evening.

Bob Fraser, from the Laboratory of Hyaluronan Research, Monash University in Australia, reminded the audience that he first encountered hyaluronan when he cultured synovial cells and found that a viscous material was produced by and surrounded these cells. Hyaluronan led him to Torvard Laurent and eventually years of very productive research collaborating with Tovar and Ulla Laurent, mostly working on the metabolism of hyaluronan. He praised the Laurent's social and professional hospitality, and he presented them with a boomerang as a reminder of their friendship and successful scientific cooperation.





Fred Bettleheim, Professor Emeritus from Adelphi University, remembered that he met Torvard in the early 1950's when Torvard worked with Bandi Balazs, a fellow Hungarian, in his laboratory at the Retina Foundation in Boston. He followed Torvard's extraordinary work on hyaluronan, and in 1965 he had the opportunity to work with him in Uppsala while on sabbatical. He thanked Torvard and Ulla for their extraordinary hospitality.

Glyn O. Phillips, Professorial Fellow (the North East Wales Institute for Higher Education), paid tribute to Torvard Laurent's outstanding contributions in elucidating the structure and metabolism of hyaluronan and his role in inspiring a large number of students and guest investigators in his laboratory who contributed so much to hyaluronan research.



Bryan Toole, professor at the Medical University of South Carolina (Department of Cell Biology and Anatomy), read a limerick he wrote in honor of Torvard:



"There was a young man name Laurent  
To whom HA was clearly God-sent  
And God said: Young man  
Please do what you can  
To make HA less random and bent

So Torvard, a dutiful soul  
Tried hard all those coils to unroll  
But they'd crowd and exclude  
And would not come unglued  
So down to the pub he then stole!

Aha! there he mused--now I'm wise  
These struggles have opened my eyes  
With Bob Fraser I'll see  
How the body gets free  
Of HA -- we'll track its demise!

So Torvard, as the years go on by  
All your friends, especially I,  
Toast Ulla and you  
- That HA GURU -  
Skol to you! And to HA on high!!"

Jenti Denlinger took the podium and told the audience that just 25 years after Torvard presented his thesis on the physical chemistry of hyaluronan in Stockholm, she defended her own thesis on the metabolism of hyaluronan at the Universite des Sciences et Techniques, Lille, France at the Faculte des Science under the sponsorship of Professor J. Montreuil (Lille) and L. Robert (Univ. of Paris). She had five professors as examiners, four of them French (Montreuil, Picard, Robert and Spik) and the fifth external examiner, Torvard Laurent. Because Torvard did not speak French, in spite of his French name and his family's French origin, she prepared the thesis both in French and English. She was grateful for Torvard's examination, which was fair, most thorough and to the point.

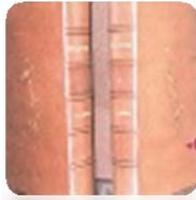


To commemorate this week of hyaluronan science in the honor of Torvard, as well as decades of friendship and scientific collaboration with Torvard and Ulla whose work paralleled her interests, she presented them with her own artistic design and craftsmanship of a pictorial hooked rug, which she called "Hyaluronan in Uppsala". It represents Torvard and Ulla in Swedish regional costumes with a May pole made up of hyaluronan molecules.

The next speaker, Endre A. Balazs (Research Professor Emeritus, Columbia University, New York; Chairman, Matrix Biology Institute) reminded the audience that the chair of the department that Torvard filled for three decades, 1966-1996, was a great importance historically. First, in the history of medical education, this was the chair that the famous botanist and medical herb specialist Carl von Linne held at the time when medical schools appointed two professors: one who was teaching macroscopic anatomy, and the later after the development of the microscope, microscopic anatomy as well; the other professor was appointed to teach the diagnostic and therapeutic effects of medicines, dominated in the beginning by the application of herbs and minerals as therapeutic agents. The chair that Torvard occupied was the direct continuation of the "basic science" aspect of the medical teaching. This department also made significant contributions to glycosaminoglycan and hyaluronan sciences in the last part of the 19th and first part of the 20th centuries, since this was the Carl Th. Morner worked on chondroitin sulfate and on hyaluronan in the vitreous, and where L. Hesselvik and Gunner Blix made their pioneering research on the hyaluronan content in the vitreous and synovial fluid.



Putting in perspective Torvard's contributions to hyaluronan, Bandi pointed out that one must acknowledge that the scientist working in this department during the course of over 100 years contributed more to the knowledge of this molecule than any other laboratory in the world. The work of Torvard Laurent, his students and collaborators represents the major contribution to hyaluronan science during the last three decades.



After these remarks Bandi presented Torvard with a two-volume leather-bound collection of Torvard's 147 papers published on hyaluronan between 1949 and 2003. On the first pages of the books the participants of this meeting signed their names to honor Torvard's work in the field and to commemorate this meeting. It was a tribute to Torvard from the hyaluronan community for his extraordinary contributions to hyaluronan sciences. "This is from all of us to you for your brilliant work in research and for inspiring future generations of scientist in hyaluronan and extracellular matrix research", said Bandi.

Bandi then pointed out Torvard's important role in 1971 selecting and convincing Pharmacia AB, a small Swedish drug company at that time (today part of Pfizer, Inc.) to take over the manufacturing and marketing of highly purified hyaluronan under the trade name of Healon. Healon at that time (1970-76) had already been tested as a therapeutic agent by Bandi and his co-workers for the treatment of arthritic pain in horses and in humans, and had as well been studied as a viscoelastic supplement to replace the vitreous during retinal surgery and as a surgical tool to protect and manipulate tissues in corneal transplantation and intra-ocular lens implantation in anterior segment surgery of the eye. At that time, several clinical studies had already reported these first therapeutic applications of hyaluronan. Then Balazs reminded the audience that the rooster became a symbol of the therapeutic use of hyaluronan because, during the first two decades of its use (1970-1990), the only source of hyaluronan for therapeutic applications was the rooster comb, and this is still the major source today.

Bandi announced that a group of hyaluronan scientist decided to start a non-profit, charitable organization devoted to supporting hyaluronan research and organizing international meetings on hyaluronan like this one. While this organization has not yet been established or named, he temporarily gave it the name "Academia Hyaluronica". He then presented a porcelain rooster to Torvard as the first Rooster Award for his significant contributions to the therapeutic use of hyaluronan. He remarked that he hoped that this tradition would be continued by the new society.



## Torvard Laurent's Acknowledgement Speech



"I am sure that you understand that I am very moved by all that has been said here tonight and during the conference. It feels unreal to be honored by a symposium for the accomplishments one has done during a lifetime. I want to thank all of you who have said many nice things and all who have come to this conference to discuss our favorite molecule, hyaluronan."

Then Torvard pointed out that he had many students, co-workers and visiting scientists with whom he worked with during the five decades of his professional career. Many of them were at this meeting. He thanked them for their work and support. He pointed out that it is impossible to mention all of them; therefore, he highlighted the major influences of those he encountered and worked with during this time period.

"I've known Bandi a long time, I have worked with him since 1949, and I have known Vince since 1974 -- when he came to work with Dick Heinegard in Lund. I want to thank both Bandi and Vince for this celebration and a very successful meeting."

Then Torvard began to describe how he started his research and continued through the next five decades. He was invited as a first year medical student at the Karolinska Institute (the Medical School of Stockholm) in 1949 by Professor Hjalmar Homgren to work in the Department of Experimental Histology. According to Torvard this was the most interesting and newly established department with several foreign scientist, among them Endre "Bandi" Balazs. Balazs had a biochemistry and tissue culture laboratory, and Torvard was assigned to work with him. Bandi introduced Torvard not only to hyaluronan, but also to the concept of the intercellular matrix, his favorite subject. Bandi became his teacher. "Bandi's enthusiasm was a great driving force for all his associates who participated in the various endeavors he undertook". The three projects in which Torvard participated in the next one and a half years: the polyelectrolyte characterization of hyaluronan, the ultraviolet light sensitivity of the molecule and the biological activity of sulfated hyaluronan, all turned out to be far from trivial contributions.

In 1950 Balazs moved to Boston at the invitation of the Department of Ophthalmology at the Harvard Medical School (Mass. Eye and Ear Infirmary) to establish research labs for the Retina Foundation primarily devoted to the research on the connective tissues of the eye. Torvard continued his work in the Department of Chemistry, at the Karolinska Institute, working with Bertil Jacobson, a physical chemist. Later, at Bandi's invitation, he joined him in Boston and spent one and a half years of his doctoral studies in Bandi's labs in the Retina Foundation. After he defended his doctoral thesis in 1957 in Stockholm, he returned in 1959 to Boston and spent another two and a half years in Bandi's lab.

Tovard then explained that in the 1960s the most important co-worker who influenced his work and thinking was Sandy Ogston. In the 1970s a pupil of Ogston, Barry Preston, was an important collaborator on the physical chemistry of hyaluronan. He then paid tribute to Lars Olof Sundelof who was his collaborator in physical chemistry for three decades, especially during the 1970s. In the 1980s his closest collaborators were his wife Ulla and Bob Fraser on the metabolism of hyaluronan, while working in Australia and Sweden. He retired as head of the department in 1996, and Paraskevi Heldin took over hyaluronan research in the department. "I am grateful she has taken over this long tradition," said Torvard.

Then Torvard paid tribute to his wife, Ulla Hellsing Laurent, for five decades of collaboration in science and life, by saying the following: "Finally I would like to thank my wife, Ulla, my collaborator for 50 years. We actually started working together in Bandi's lab exactly 50 years ago. She came over to New York with me, and we were married on October 10, 1953 in New York City. We celebrated our 50th wedding anniversary just a few days before we came to Cleveland." Then Torvard mentioned that since he retired he was asked to give talks from time to time to young graduate students at the University of Uppsala. He said: "I used to tell my own story to the young graduate students at Uppsala. It is extremely important how you start your research career. That is the impetus for everything, and I got a fantastic start with Bandi. Then after that, of course, it is just regular work. People talk about visions, to see in the future about what should do done. I wonder. My experience is that you apply for a research grant and it is accepted; after 3 years you have new results and apply for another grant, etc. Then in the end you look back, and there you have your vision. It is not until you see what comes out of it that you can really understand what it was all about. In spite of my limited capacity to see into the future I have always believed in the medical applications of hyaluronan, and after listening to all the lectures and all the new results, I am even more convinced that hyaluronan and its modified forms will play an important role in future therapeutic applications. Thank you all for your kindness, and especially thanks to the organizers, Bandi and Vince."