Professor Arto Urtti had his 60th birthday in December 2016. He is currently the Professor of Biopharmaceutics at the University of Helsinki and University of Eastern Finland (UEF). He was the editor-in-chief of European Journal of Pharmaceutical Sciences (EJPS) in 2001–2011, and this special issue of EJPS is dedicated to Arto in honour of his 60th birthday. The celebrations include a scientific conference entitled "30 Years of Drug Delivery Research" in Kuopio, Finland, on June 12–13, 2017. It is our great pleasure to give a short summary of his career in this editorial.

After his high school years in Jyväskylä, central Finland, Arto was pondering whether to choose a career in history or pharmacy. Based on his interest in biology he chose pharmacy and entered the University of Kuopio (currently UEF, Kuopio Campus) in autumn 1975. That was the third functional year of this new university and the total numbers of pharmacy students and all students were only about 50 and 600, respectively. The main buildings of the university were still under construction, and the lectures and laboratory exercises were arranged in multiple temporary locations. The "eyewitnesses" to Arto's study years and long-term colleagues tell their view in Story 1.

Despite the unfinished environment at the university, the spirit was forward looking, and some teachers inspired Arto, for example Ewen MacDonald, Jouko Tuomisto and Hannu Turakka. Arto carried out Master's Degree having both pharmacology and pharmaceutics as major subjects.
He became interested in research career during the third year of studies and was recruited as Ph.D. student by pharmaceutics professor Markku Juslin in 1981. Arto’s topic was ocular delivery of pilocarpine and he got his Ph.D. degree in 1986. One of Arto’s supervisors was Lotta Salminen who describes her collaboration with Arto starting from Day 1 in Story 2.

During post-graduate studies Arto became interested on the main topics of his research career, such as ocular pharmacokinetics and modeling and drug delivery systems. Many long-term friendships started during that time. International orientation started when Arto traveled to his first scientific conference in Copenhagen using boats and trains.

Arto worked as a postdoctoral fellow at the University of Kansas, Department of Pharmaceutical Chemistry, under host by Professor Arnold Repta in 1986–1987. Professors of Kansas were models for Arto in building research program and group. Later, several members of Arto’s research group have made post doc visits to the same department.

After his return to Kuopio University in 1987 Arto started to build his own research group as the Assistant and Associate Professor of Pharmaceutical Technology (1987–1995) and Professor of Biopharmaceutics (1996–2005). The first Ph.D. students supervised by Arto were Ulla Finne, Kristiina and Tomi Järvinen, and Jouni Hirvonen. Their topics included ocular pharmacokinetics of timolol, prodrugs of pilocarpine, and enhancers for transdermal administration. Arto was (and is) an inspiring supervisor and role model, since three of these students later obtained positions as professors. In 1990, Arto was hosted at the University of Wisconsin by the legendary ocular pharmacokineticist, late Professor Joseph R. Robinson.

In early 1990’s Arto became interested in non-viral gene delivery and drug targeting. Arto invited Professor Francis Szoka from University of California San Francisco (UCSF) to visit Kuopio. Frank was even better “salesman” and managed to grab Arto and his family to UCSF (Story 3). Arto spent his UCSF sabbatical at departments of pharmacy (host Frank Szoka) and ophthalmology (hosted by late Professor Jon Polansky) working on ocular gene delivery with nanoparticles. In 2000, Frank was nominated as Honoris Causa at UEF by Arto’s proposal. In 2000, Arto moved with his family to UCSF for the second time, now hosted by Professor Wolfgang Sadee, working on drug transporters (Story 3). Pharmaceutical nanotechnology and transporter research are still Arto’s primary research fields, e.g., light activated or targeted liposomes.

In 2005, Arto started as the director of Centre of Drug Research, University of Helsinki, a research centre with temporary funding. After highly positive external evaluations, University of Helsinki provided permanent funding for this centre. Arto actively developed the infrastructures in Helsinki by launching preclinical SPECT/CT real time imaging laboratory. This laboratory and bioactivity screening facility were also developed as national infrastructures within Biocenter Finland. Recently, bioactivity screening facility is being extended to European level (ESFRI) infrastructure, EU OpenScreen, that benefits scientific community broadly.

In Helsinki, Arto started a new research field in his group on interactions of biomaterials with cells. This is utilized in drug testing and cell encapsulation. Based on all his achievements Arto received the Millennium Distinction Award in 2009. He successfully proposed with his colleagues Millennium Award for Robert Langer who works in the field of drug delivery and biomaterials, and Honoris Causa at University of Helsinki for Jindrich Kopecek. In 2013 Arto started as the Professor of Biopharmaceutics at University of Helsinki.

In 2015, Arto obtained a position as the Professor of Biopharmaceutics at UEF, Kuopio Campus, while keeping his position in Helsinki. This was a move back to Arto’s roots and he has concentrated to work with his “first love”: ocular drug delivery. Arto’s group is Kuopio is expanding constantly, e.g., international students from Marie Sklodowska-Curie network “OcuTher” will start their Ph.D. studies in summer 2017.

Arto has generously contributed to many national and international scientific funding organizations as a grant reviewer, evaluator on academic promotions, reviewer of scientific manuscripts, journal editor and he has organized three international meetings. During the years, he has consulted several pharmaceutical companies. It is clear that his opinion is highly valued by the research community.

From the early phases of his career Arto has been energetically promoting the education in pharmaceutical sciences at all levels. In addition to being a very productive supervisor of M. Pharm. and Ph.D. students he has started the national graduate school in pharmaceutical sciences. Currently, he is heading in Helsinki a research line for undergraduate pharmacy students aiming to attract and motivate young students to the research career.

Arto is a very positive and friendly person with a gentle sense of humor. His relaxed presence creates a cozy and informal atmosphere. He is always polite and humble in behavior and does not make an issue of himself. He is an entertaining companion in off-duty events. When leading his multiple projects he stays amazingly peaceful even in very busy moments. There are no dead-ends for Arto. He finds a way to attack the scientific problem from a different angle. He is always ready to talk science, but he also takes care of the overall well-being of his students, colleagues and friends.

This special issue is based on the work of Arto’s friends and colleagues. The topics and articles of this issue and related symposium reflect Arto’s career and contributions in biopharmaceutics for over 30 years.

We all have had the pleasure to collaborate with Arto and we wish him good luck in the future! Lotta Salminen1, Francis Szoka2, Wolfgang Sadee3, Petteri Paronen4, Jukka Mönkkönen5, Marika Ruponen5, Marjo Yliperttula6 and Veli-Pekka Ranta5.

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Story 1 by Arto’s fellow students and long-term colleagues and friends

We have known Arto as a fellow student, colleague and friend since mid-1970s. Arto started his pharmacy studies together with Petteri in 1975 when the University of Kuopio was still a “baby”, just three years old. We students felt that we were the true pioneers or almost like “guinea pigs”. The personnel at the Faculty of Pharmacy were learning to educate whereas we were learning to study.

During the study years, it occasionally seemed that we were studying life more than pharmacy. Music as well as deliberation on deep values have always been close to Arto’s heart. We used to listen to music, dance and dwell on the purpose of life until the early hours.

Nevertheless, we also learned to study. We realised that the pedagogical skills of many of our university teachers were modest. Therefore, we spent time elsewhere and preferred to study intensively and independently for the exams.

During the last two years of our pharmacy studies we became interested in research. Arto also lost his desire to own a pharmacy store. Very few
people have probably announced that decision in the press as we then did with Arto. Instead of having careers as pharmacists in community pharmacy, we all committed ourselves to those areas of pharmaceutical research that were closest to our hearts. We firmly decided to sacrifice our careers for science. We all weren't fully true to this, but Arto was.

From the very beginning, Arto created a new pharmaceutical research field in Finland – combining biopharmaceutics, pharmaceutical technology and pharmacology. Contacts with researchers in other fields such as medicine, biosciences, engineering, polymer chemistry and electrochemistry soon became everyday life at the Faculty of Pharmacy of the University of Kuopio.

Arto was the trailblazer also in creating international contacts and collaboration. During our numerous conference trips and visits to the prestigious research labs, we networked extensively by contemporary standards. During these trips we also became very familiar with local rock clubs and other cultural events.

Contacts with the pharmaceutical industry also had a vital role in the creation of fruitful research culture. Arto was in fact building "Innovation Ecosystems", even though such terminology was not used at that time.

Scientific research surely enriches Arto's life. Thanks to Arto's open-mindedness, we now have a permanent and productive pharmaceutical research culture in Finland - and this was created almost from scratch.

Arto loves challenges and he strongly encourages and supports his colleagues and friends. It has been a great pleasure and honour to work with him over four decades. He has been an outstanding colleague and, above all, a great friend.

Petteri Paronen1 and Jukka Mönkkönen2.

1Former Professor of Pharmaceutical Technology and Rector of the University of Kuopio, current Mayor of Kuopio City.
2Professor of Biopharmaceutics and Rector of the University of Eastern Finland.

Story 2 by the supervisor of Arto's Ph.D. studies

It was late October in 1980 when pharmacy student Arto Urtti from the University of Kuopio visited me at the University of Turku, Department of Ophthalmology. Few months earlier I had contacted Arto’s mentor, Professor of Pharmaceutical Technology, Markku Juslin, and kindly asked him if any of his students might be interested in ocular pharmacology. Two candidates signed up. Arto stayed. After refreshing and profound discussions in Turku, Arto left to Kuopio with photocopies and literature references on the drugs and the eye. We were ready to work together on ocular pharmacology.

At the beginning of the 1980s ocular pharmacology was a niche area. Indications and available drugs to treat the ocular diseases with local or systemic drugs were low in number: antibiotics, corticosteroids and a limited number of antiglaucoma drugs. Basic pharmacokinetic parameters, absorption, bioavailability, distribution and elimination, were missing for most ocular drugs. Even the dosage, the drop volume and drug concentration, varied greatly in the products manufactured by different companies. Patient compliance was low.

At the University of Turku, my mentor in ophthalmology, Professor Arvo Oksala, a pioneer of ultrasound, was interested and contributed to my studies on ocular pharmacology. As a specialist in ophthalmology, I graduated in 1973 as Ph.D. with “Distribution of systemically administered penicillin G, ampicillin, cloxacillin, tetracycline and doxycycline in the rabbit eye”. My two years at the University Eye Clinic in Bonn in mid-1970s as an Alexander von Humboldt Fellow offered me not only interesting scientific surroundings but also contacts with prominent researchers in the field of ocular pharmacology.

Some years later Saiichi Mishima, Makoto Araie, David M. Maurice, Vincent H.L. Lee, Jose Cunha-Vaz, Marco F. Saetzone and Y.F. Maichuk, presenting the Russian Soluble Ocular Drug Inserts (SODIs), were referred to in our publications and became our discussion partners. They appreciated Arto's innovative perspectives to enhance ocular drug treatment.

As a Senior Researcher at the Academy of Finland in 1983, I was able to join Arto as a co-worker and supervisor at the University of Kuopio which offered generous surroundings for Arto's animal studies. Arto's Ph.D. thesis “Delivery and pharmacokinetic aspects of ocular pilocarpine administration” was accepted in 1986 with Marco F. Saetzone as a referee.

With Arto's enthusiasm and energy as an academic teacher, we arranged seminars on local ocular drug delivery and kinetics with lecture note booklets for Finnish ophthalmologists and pharmacologists in Kuopio in 1984 and 1987. Thereafter, ophthalmologists have been able to join numerous seminars on ocular pharmacology arranged by Arto in Nordic, European and World Ophthalmology congresses.

Before all, Arto's role as an educator and supervisor of Ph.D. students at the University of Kuopio, later the University of Eastern Finland, and at the University of Helsinki, is remarkable. For my own part, I have had the honour to prepare review articles with Arto for journals and books. Furthermore, as the Professor of Ophthalmology at the University of Tampere since 1988, I was several times invited to review and to be the opponent for Ph.D. students supervised by Arto and his team at the University of Kuopio.

Gene therapy and its possibilities in ophthalmology was the title of the lecture given by Arto in my retirement seminar at the University of Tampere in 2004. The research continues and it is in good hands.

Lotta Salminen, M.D., Ph.D.
Tampere University and Tampere University Hospital, Finland.

Story 3 by Arto's hosts at the University of California San Francisco

Frank

My collaboration with Arto started because he was interested in applying non-viral gene delivery systems to the eye. This led him to inviting me to Kuopio in August 1993. I remember driving past the Olympic ski jump close to Kuopio University and seeing the Northern lights on a trip to Santa Claus Reindeer land in Lapland... ('weak minds are easily influenced'). I also remember meeting Arto’s physician wife, and young family and telling them about the sunshine in the San Francisco Bay area. This sales pitch convinced Arto and his family to visit our group from 1994 to 1995.

Our group at that time was like the United Nations, with Fellows and students from all over the world. Arto was the calm in the eye of the storm. Arto and his family lived in Marin, his children took up mountain biking and they rapidly became Californians. It was ideal for me because members in my group could bounce their ideas off of Arto. Everyone who has interacted with Arto knows his calm, logical manner and that he does not jump to conclusions. He would provide logical feedback that balanced my enthusiasm. He is adept at pointing out inconsistencies in experiments and calling...
for the addition of the appropriate controls.

We have continued a friendship after Arto’s visit to our group. We interact at various meetings, as well as when his travels bring him through San Francisco. I greatly enjoy discussing ideas and approaches to drug delivery with Arto. For me, Arto is the perfect sounding board; someone who is knowledgeable about the subject, generous in listening to yours ideas and sharing his, and kind in correcting errors. It is clear from our most recent talks that the best from Arto is still to come!

Wolfgang

During his Sabbatical at UCSF, Arto decided to expand his knowledge in genetics, with focus on membrane transporters. This led him also to join my group at UCSF in 2000. When he came down to us for the first time (we were located on the 8th floor, so that is down from the Szoka lab), I remember his calm demeanor enigmatic smile, creating the aura of a sincere Nordic scientist. But this impression quickly dissipates upon further interaction, as Arto is rather playful and open minded, a wonderful colleague to have in the group. In many ways, adopting a genomics view of the membrane transport world grew into a lasting interest that has clearly contributed to his broad view of the science he loves and continues to enrich. I did visit him twice, in Kuopio and Helsinki, to take a Finnish sauna (the playful side) and to give a lecture series on genomics (the serious imperative).

Together

We think one can evaluate a person by observing if their children follow in their parents' tracks. Arto’s children have followed in the intellectual tradition of Arto and his wife and become a writer, adventurers, coders and engineers. This is the best outcome a scientist can attain from their children; the realization that trying to understand the world around us through the scientific method and to use this information to make a better world is the basis for a good life.

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