



Finland 2007



Study visit report

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Introduction

Turku, Finland 30th May-2nd June. The bus behind us screeched to a halt as we pulled into the lane ahead of it. "Sorry" I apologised to Stefan who was driving the car - I had just realised, far too late, that we should have turned left. The other cars containing the rest of the sleep deprived LiU PhD students duly followed as I directed us in circles around the streets of Turku. I will never be allowed to be in charge of the map again! This years Forum Scientium study visit was to the island city of Turku (Åbo) in Finland. The purpose of the trip was not only to enjoy boat trips through the beautiful archipelago and to take a sauna and swim in the brackish waters of the Baltic, but also to visit some of the companies in Turku Science Park, BioTurku - the leading biotechnology centre in Finland, Åbo academy, and Turku university. Throughout our visits we met with young professionals who had recently finished their Ph.Ds, they gave us many useful insights into how their early careers had developed. Thanks go to Paula Linderbäck, Git Johansson, and Pernilla Eliasson for organising the trip.

Turku Science Park

At 9:00 Katja Wallenlind gave us information about Turku Science Park. Turku Science Park (<http://www.turkusciencepark.com>) is a community of experts with the mission to speed up the growth of new technology businesses. Turku Science Park has two focus areas; biotechnology and ICT. These focus areas have been branded Bio Turku and ICT Turku. There are two business incubators within the bio technical and ICT area that assist start-up companies with expert services such as advice on internationalisation, contact with universities, financiers, collaborating companies and office services as well as access to private and common laboratories and premises like office space, conference rooms etc. The newly started companies are mostly based on university research and are supported by the incubator for three years. So far over 160 new companies have been started and more than 850 jobs have been created in the Turku Science Park. Turku Science Park also implements the Venture Cup in Southwest Finland. Geographically the core of Turku Science Park comprises a 5 square kilometre area. Turku Polytechnic and Turku University Hospital as well as the three universities; Åbo Akademi University, Turku University and Turku School of Economics and Business Administration, which all have associa-

tions with Turku Science Park. Turku Science Park group companies are responsible for the management and development of Turku Science Park. This is in close co-operation with universities, polytechnics, companies and public actors. The mother company is Turku Science Park Ltd with the subsidiaries; ICT Turku Ltd and Turku Bio Valley Ltd. The chairman of the board is Tom von Weymarn who is also the chairman of the board in TeliaSonera AB. Close connection to industry is advantageous as well as the location of the Turku Science Park, near the motorway, airport and the town centre.

Written by Tomas Rakickas and Karin Wermelin

Orion Pharma

On the morning of the first of June, 7 graduate students and Stefan Klintström visited Orion Pharma. Orion is a European, R&D based, pharmaceutical and diagnostics company and Orion Pharma Corporation is a Finnish listed company, which develops, manufactures and markets pharmaceuticals, active pharmaceutical ingredients and diagnostic tests for global markets. In addition, Orion carries out intensive research with the aim of bringing new proprietary drugs to the international market. It was founded in 1917, the same

year as the Finland independence. We were welcomed by Anu Moilanen, a Senior Research Scientist of the General Pharmacology Department. We presented our University and our doctoral programme, Forum Scientum, and she presented the company's activities and research. Orion Pharma has several different businesses, but Pharmaceuticals generate about 95% of Orion's net sales, of which, a considerable part comes from proprietary patented pharmaceutical innovations. Orion has launched seven new chemical entities to the market, and carries out intensive research with a goal to introduce additional new treatments into global markets. The core therapy areas in Orion's product and research strategy are: The central nervous system Parkinson's disease: (PD) is one of the main focus areas of Orion. Cardiology and critical care Hormonal and urological therapies: They developed drugs for the treatment of advanced breast and prostate cancer.



Listening at Turku science park

Orion has also a large portfolio of generic, off-patent prescription medicines, hospital treatments and self-care products. These products are sold mainly in Finland, other Nordic countries, the new EU countries and Germany. In animal health, they have developed animal sedatives, and have the leading market position in its home territory - the Nordic countries. Another important business area is diagnosis. Orion's diagnostic tests are sold widely across the world to help the diagnosis of patients and the follow-up of treatment. The emphasis in this product sector is on easy-to-use and rapid point-of-care tests. Anu also explained to us how the discovery of a new molecule needs a long time before it can be realised as a new drug, and the development goes through many phases taking 10-15 years. Harry Bj(ö)rklund talked to us about nonclinical pharmacokinetics. In this case nonclinical means preclinical, so all in vivo and in vitro studies performed before the clinical trials. He explained to us the drug development process, which requires 10-15 years at a cost of 500-900 mil. USD.



Tour of Turku castle

During the first stage there are a lot of molecules able to reach a goal, but at the end only one becomes a drug. Most of them fail when they are tested on animals and humans. In the clinical development there are three different phases, starting from healthy volunteers and proceeding to 200-500 patients then 1000-5000 patients. The price of these different phases increases exponentially.

Stephen Rudd talked to us about bioinformatics and drug development. The bioinformatics is the possibility to solve a biological problem using a computer. It is a relatively new approach, which make use of mathematical tools to extract useful information from data produced by high-throughput biological techniques such as genome sequencing. A representative problem in bioinformatics is the assembly of high-quality genome sequences from fragmentary "shotgun" DNA sequencing. The first bioinformatics database was created in 1965. The protein Data bank goes back to 1972. Since the Phage ϕ -X174 was sequenced in 1977, the DNA sequences of hundreds of organisms have been decoded and stored in databases. The information is analyzed to determine genes that encode polypeptides, as well as regulatory sequences. A comparison of genes within a species or between different species can show similarities between protein functions, or relations between species (the use of molecular systematics to construct phylogenetic trees). With the growing amount of data, it became impractical to analyze DNA sequences manually. Today, computer programs are used to search the genome of thousands of organisms, containing billions of nucleotides. These programs would compensate for mutations (exchanged, deleted or inserted bases) in the DNA sequence, in order to identify sequences that are related, but not identical. A variant of this sequence alignment is used in the sequencing process itself.

A lunch ended our study visit to the Orion Pharma, during which most of us continued the conversation about companies, research, university and our future. Contact info: <http://www.orion.fi>

Written by Emanuela Gatto



On the island

PerkinElmer

After lunch on Thursday, part of the group visited PerkinElmer. This company used to be called Wallac Oy before being acquired by the large American instruments manufacturer. At this site, analytical instruments utilizing a number of different techniques are developed and manufactured. Most of the instruments have one thing in common: the application is neonatal diagnostics. This means that the aim of the instruments is to analyze samples from newborn babies so that any disorders may be found early in life. Many conditions can be treated if discovered early enough, and therefore this is a routine practice in maternity wards around the world. PerkinElmer is marked leading in this field and most of the research is carried out in Finland.

We were first introduced to the company and it's history and products. The main techniques used are fluorescence (for immunoassays) and tandem MS (for small-molecule detection).



View from the island

The immunoassays use a proprietary fluorescent label, DELFIA. It is based on the unusual fluorescence behaviour of lanthanides, in particular europium. The long decay time and large Stokes' shift of the probe

makes it possible to perform very sensitive measurements. The company sells kits complete with antibodies and pre-coated microtiter plates. Three PhDs working at the company had also been invited. They gave their view on how one should prepare for the world outside university. The lessons they had to give ought to be valuable, since all of them seem to have been hired by PerkinElmer very quickly after graduating. There was also some time to ask questions before we moved on to the next part of our visit.



FS outside Turku castle

There was a tour of the manufacturing areas of the factory. We could not enter the areas where the sensitive biological reagents were analyzed and packed, but we could take a look through large windows from the corridor. We were then guided through the instrument-assembly area, where the different instruments were on display, most of them not yet completed. After this, we thanked our hosts for welcoming us to their company and headed back to Turku City to meet up with the rest of the group and continue our exploration of Finland.

Written by Tobias Ekblad

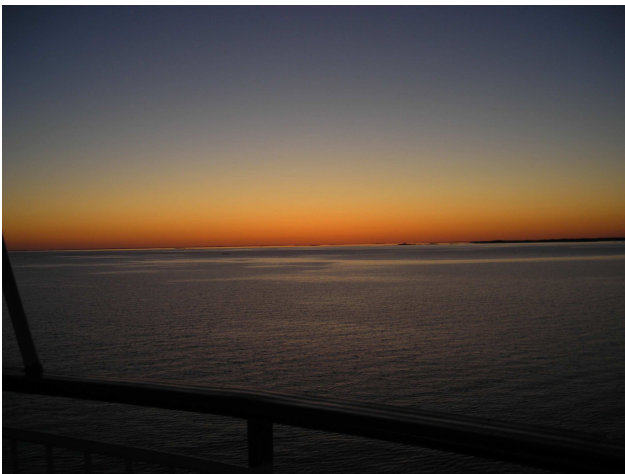
Turku Centre for Biotechnology

On June 1st, Friday, part of the FS group visited Turku Centre for Biotechnology (TCB), where Rolf Sara hosted and guided the tour.



Breakfast on board

TCB belongs to the Biocity organization, which is supported by both (Å)Åbo Academi (c.a. 6000 students) and University of Turku (c.a. 15000 students), and which integrates the so-called Triple Helix model of Turku: Biocity/Turku Science Park/ Biobusiness. TCB was founded in 1989 and was initially dimensioned for 35 people. Just one year later, 80 people were forming it and nowadays it is composed of 200 people divided in 25 research groups. The aim of this centre is to promote high-quality research as well as establishment and support of technologies and facilities, in topics such as Cell signalling and Molecular Biology. Although at the beginning TCB was supposed to be a core-facility unit offering an instrumentation service, it was found that an active research meant an efficient method development. Hence, we could highlight the 63 publications (25 of them with an impact factor over 5) and 5 PhD dissertations from 2006 and a funding structure of 7.6 Million Euros.



Sunset from the ferry

From their core-facility services the most important one is the National DNA Microarray Research Centre, with 250 customers. But also Cell imaging Core-facility (CIC) and the areas of Proteomics, Bioinformatic and X-ray Crystallography are a great importance for them. National Microarray Research Centre,

founded in 1999, provides diverse types of glass-based DNA microarray slides, ready-made and custom-made human and mouse cDNA arrays. In addition, the centre hosts Affymetrix GeneChip® technology services to be used for genome-wide RNA expression profiling in a wide range of species. The centre's services cover the entire process from sample preparation to preliminary data analysis.

The visit concluded with a guided tour around the labs, where the different devices needed for their measurements were explained.

Written by Janosch Hennig and Jagoba Iturri

Biocity

The 1st of June afternoon, we were visiting the national graduate school in informational and structural biology (ISB) division for biochemistry and Pharmacy, Biocity. There were coffee, tea and snacks served at the arrival. Professor Mark S. Johnson, the director of the school, welcomed us and gave a short presentation of the graduate school.



The graduate school

The graduate school was established at the end of 1997. Today they consist of 37 researchers and 70-75 students from all over the country. They have about 120-150 publications/years. More about their graduate school can be found on the homepage www.abo.fi/isb/. Thereafter Sebastian Schultz gave a short presentation of us and our graduate school. Then three Ph.D students from each group had a short presentation about their research. Daniel K, Satish M and Patrik N were representatives from our group. From their group, the talkers were: Lenita Viitanen presented her study on the sterol carrier protein-z from plants and she had collaborations with Dr. Johan Edquist and Maria Sunnehagen in Sweden Susanna Repo told us about her study of the binding properties of HABA-type azo derivates. Helena Ahlfors's presentation was about monocytes, macrophages and dendritic cells.

We were served beers afterwards, and it was a nice finish of the afternoon.

Written by Lan Bui



In the archipelago



Forum scientum members on the steps of Turku cathedral