Editorial

Dear Biozentrum Alumni,

We are pleased to introduce you, once again, to two Biozentrum alumni; this time Christian Sengstag, Deputy Vice President for Research at the University of Basel, and Barbara Geering, Discovery Scientist at F. Hofmann-La Roche.

Alumninews also talked to three emeritus professors who are anything but retired and can still frequently be seen at the Biozentrum. Urs Meyer and Anna and Joachim Seelig give a glimpse into current projects, alternative research careers and the pros and cons of being emeriti. Then, Pascal Mäser, Parasitologist at the Swiss TPH and yet another Biozentrum alumnus, sheds new light on world history and on how parasites have changed its course, and finally Janine Zankl, Head of the FACS Core Facility, invites you into her multi-colored working place.

We wish you enjoyable and interesting reading

Prof. emeritus Hans-Peter Hauri,
President of the Biozentrum Alumni Board

Prof. Erich Nigg.
Director of the Biozentrum and Member of the Alumni Board
Exploring new horizons.

Christian Sengstag had never imagined that he would one day do anything other than research. But then he was presented with a fait accompli: His research institute was to be closed down. So he took the bull by the horns and, unexpectedly, completely new doors opened up for him. Today the Biozentrum’s alumnus works at the Vice Rectorate for Research at the University of Basel and enjoys the high level of creative freedom as well as the close proximity to research.

Alumninews You have been working at the Vice Rectorate for Research at the University of Basel for almost ten years. What are you currently working on?

Christian Sengstag At present, I am particularly involved with the Talent Promotion Committee. I review the applications submitted to the Research Fund for Junior Researchers, interview the candidates and have them explain their project proposals. This is always very interesting. And as the right hand of the Vice Rector, Ed Constable, there are always numerous smaller projects requiring my attention. Material orders for the mouse facility in the new Biozentrum building is also my responsibility and I am generally involved in all matters regarding the mice. Last October, I was elected to the Cantonal Commission for Animal Experiments by the Government Council of the Canton of Zurich. At “swissuniversities” we are working on a Swiss-wide 3R strategy, dealing with the three aspects Reduce-Refine-Replace in animal experiments, along with the establishment of a 3R center of competence. And as always, I continue to hold my lecture in the “Master in Drug Sciences program” on genetic toxicology, the subject, in which I previously conducted research at the ETH Zurich.

An Your tasks are very varied...

CS Yes, that’s true. What I particularly enjoy is the contact with a lot of different people. Recently, I contributed to a workshop for the Novartis Next Generation Scientist Program where I met so many interesting, highly motivated young people. It is truly a colorful, multicultural event. Some 20 to 25 young scientists from developing countries can participate and work on a research project at Novartis for three months. On one afternoon they receive a skills course, on topics such as Scientific Integrity. I always compile the program and also present an overview of the University of Basel and the life sciences in the region. Another great thing about my work is the freedom I have. In 2015, for example, I was involved in planning the “UniNacht”. Arranging the 260 events under one roof proved to be quite a challenge. And organizing the lecture series “Weltenreise” – Journey to Other Worlds – is always super, too.

Since 2007, Christian Sengstag has been working at the Vice Rectorate for Research at the University of Basel, where he is responsible for research management and for matters regarding animal experiments. He studied biology at the University of Basel and conducted his doctorate at the Biozentrum under Prof. em. Werner Arber. At the end of the 1980’s he carried out research as a postdoc with Albert Hinnen, at Ciba-Geigy, and at the University of California, Berkeley, in Prof. Jasper Rine’s lab. From 1989 to 1999, he was a research group leader at the Institute of Toxicology of the ETH and University of Zurich and habilitated there in 1994. He then worked as project leader at the Center of Teaching and Learning at the ETH Zurich and, from 2001 to 2007, headed the Network for Educational Technology (NET) at the ETH Zürich.
An You are often to be seen at the university’s public events. Are you there as a visitor or is this part of your job?

CS A bit of both. I am often representing the Rectorate but I am also personally interested. The dedication of the Uni members is great. How much work this involves, I know from my own experience and so I can really appreciate it.

An With your “habilitation”, you had actually achieved a high rung on the academic career ladder. Why did you eventually decide to abandon this course?

CS To leave research behind was very difficult for me. I thought there was nothing more interesting. At that time, I had a permanent position as a research group leader in Genetic Toxicology at the Institute of Toxicology, which belonged to both the ETH Zurich and the University of Zurich. That was my dream job. Sadly, the institute got into problems and in 1997 the President of the ETH announced that the institute would be closed in four years. So I just tackled the issue head on and started to apply for a professorship, although I was actually not striving for such a position. In the interviews that followed, I’m sure it was obvious that my heart wasn’t in it. And so nothing evolved. Yet, although this time was not very pleasant, it gave me the necessary space. So, I attended many courses, became interested in e-learning and found that teaching was fun. Finally, I decided to risk moving in a completely new direction.

An That was a radical break in your professional career. How was this time of uncertainty for you?

CS The two years until something new opened up were difficult and frustrating. There were naturally moments of self-doubt. But I was also realistic enough to recognize and accept that there was nothing for me to pursue in research. Now, in retrospect, I am happy about my decision. It opened new horizons for me. For instance, as a project leader at the Center of Teaching and Learning at the ETH Zurich, I developed the curriculum for students and lecturers. Later, as the head of NET – Network for Educational Technology – I initiated and promoted the development of the modular e-learning system, ELBA. Since I was familiar with the researchers’ reality, with not enough time to intensively deal with e-learning platforms, this collection of simple tools was well received.

An You did your PhD in Werner Arber’s lab. What do you remember from that time?

CS The atmosphere in Werner Arber’s lab was great and we had much freedom in our work. The Microbiology department was like a family. I also have good memories of the Biozentrum. Even now I like to go back there. The smell of the culture medium hasn’t changed and I love it. The funny thing is that, at the time, I didn’t realize that I did my PhD at the University of Basel. I thought I would get my doctorate from the Biozentrum. The institute was so autonomous – it was a completely different planet. And it was great that the PhD students were completely and fully accepted. That was very motivating.

An And what came after your thesis?

CS Following two years as a postdoc with Albert Hinnen at Ciba-Geigy, I wanted to go to the United States, more precisely, to the West Coast. So I wrote to several universities there requesting their annual report. They all arrived by air-mail; it was the end of the 1980’s and internet was not around yet. I wrote to the leaders of the research groups which interested me to ask if I could visit them during my USA holiday. Almost all agreed and were interested to meet me. So I packed my set of slides – real photographic slides – and headed off. I visited San Diego, the UC Davis and UC Berkeley. Finally, I went with my wife and a SNF stipend in my pocket as a postdoc to Jasper Rine at Berkeley.

An How was research in the United States?

CS The time I spent at Berkeley was great. I learnt so much and loved being in a cutting edge research lab again. You couldn’t imagine today under what conditions we did research there. I only had a tiny bench space; everything was crammed full and very old. Space was so little that solvents were kept in square bottles to save space by stacking them. The remains of solvent spills stained the brown wooden furniture. That was, however, irrelevant for us. The only important thing was to do good research.

An You never doubted that you would return to the region after your postdoc. As a true born and bred “Basler”, what do you like here the most?

CS The multicultural flair and the openness of the city and its inhabitants is something that I truly value. The culinary diversity, the joy of living – also the location close to France and Germany, with its many hiking possibilities. I like how well the city has developed in the last ten years. It has become more bike friendly and the quality of life is increasing. Basel is flourishing. And with my Museum Pass I diligently enjoy the rich cultural program. “Der Blaue Reiter” – The Blue Rider – exhibition at the Fondation Beyeler is on my list of things to do. And the fact that many of our friends also live here makes living in the region especially nice for me.
Insights and outlooks.

It only takes the lift 36 seconds to zoom up to the 38th floor of the Roche Tower. Here, in the Pebbles Lounge, far over the rooftops of Basel, Alumninews meets with Barbara Geering, Senior Scientist at Roche and a Biozentrum’s alumna. And though the clouds obstruct the view at the elevation of 162 meters, the scientist makes up for it with granting us many insights into her life.

An You recently dared to take the leap from academia to the pharmaceutical industry. Was this your plan?
BG Yes, this step was indeed planned. Until the end of 2014, I led a small research group in Synthetic Immunology at the Department of Biosystems Science and Engineering (D-BSSE) of the ETH Zurich in Basel. But for some time, I had already been thinking about what direction I should take in the future – should I stay in academia or go to industry? After balancing up the pros and cons, the outcome favored the move to industry.

An What were the reasons?
BG There were two main reasons for my final decision to go to industry. The first was based on science. We had had various publications in the area of applied science but academic research usually remains at the mouse model stage. That was a pity because certain concepts were very exciting. Here, at Roche, it is now the goal to push such ideas further, hopefully to provide next-generation medicines. The other factor had to do with my career path. At the university, my next step would have been a professorship. Since I wanted to stay in Basel and there were no openings, private industry was the road to take.

An Did you ever regret your decision?
BG No, I like being at Roche very much. In retrospect, I rather question why I didn’t take this step earlier. However, in the various stages of my life at the university, I had always enjoyed the work I was doing.

An In comparison with being at the university what has now changed for you?
BG Conducting research in academia is fantastic in regard to independence and freedom in the choice of topic. This is different in my current position, as much more is determined by others. I have more meetings and, along with my major project, I am also involved in a variety of different side projects. What I very much enjoy at Roche is the spirit to achieve goals together. I get support from all sides, proper teamwork. At the university, I had to look after myself. There were always small battles to fight: Which is your rightful place on the publication? How much space do you have in the lab? And in the end, you compete with your colleagues for the same funding. As a result collegiality may somewhat dwindle.

An It is said that for a longtime university researcher, it is difficult to get a position in industry. How was it for you?
Alumni portraits

Barbara Geering works as a Senior Scientist in the Immunology and Inflammation unit of Pharmaceutical Research & Early Development at Roche. Until moving to the pharmaceutical industry in 2015, she followed the classical university career path. She studied biochemistry at the University of Basel and graduated with a Diploma from Prof. Urs Jenal’s group at the Biozentrum. After completing her PhD at the Ludwig Institute for Cancer Research in London in 2006, she returned to Switzerland and worked as a postdoc at the University of Bern and later as a senior researcher at the Department of Biosystems Science and Engineering of the ETH Zurich. She lives with her husband and two children (3 and 5) in Basel.

BG I guess I was lucky. About four years ago, Roche closed the Department of Immunology in the US and decided to reestablish it in Basel in 2014. It was the same year, that I made my decision to turn my back on academia. The advertisement for a Senior Scientist in Immunology was the first such job that I found. Of course I applied. After almost one year – that’s how long the process took – I did, in fact, get the position.

An What do you do as a senior scientist?
BG Actually my work now is not so different from that previously at the D-BSSE. I generate ideas, discuss the experimental results and give input on how to develop the project further. What has changed is the way I work. In our unit, Immunology and Inflammation, we work with the so-called Matrix System. We don’t have a fixed team but rather a pool of research associates who are allocated according to the project. Then there are also experts in pharmacology or chemists or other external specialists who may join the project as required. This works as a modular system. Whenever the need arises, the team is supported.

An And what are you working on?
BG We are investigating inflammatory processes in individuals who have an autoimmune disease. Usually, the immune system is activated, for example, by harmful bacteria or viruses and after the successful elimination of the invaders, it settles down, i.e. it returns to homeostasis. However, in autoimmune disorders, the immune system is chronically activated, causing collateral damage. We are trying to influence the immune cells in such a way that these cells use their own regulatory mechanisms to stop the inflammatory reaction, with the aim of developing new treatment approaches.

An Your first steps in research were taken in Urs Jenal’s group at the Biozentrum…
BG Yes, because he and his group were impressive in the way they approached science. His lectures were very captivating, he was very enthusiastic. Hence, it was not so much the topic itself that inspired me. Also in the later steps in my career, I was generally relative flexible about the choice of topic. The research environment, the current hypotheses and the technical applications were often decisive factors but, above all, I especially enjoy working in an optimistic atmosphere, where people enjoy their work, research and discoveries.

An So why didn’t you continue on in his group to do your PhD?
BG At that time I wanted to leave Basel, preferably to go abroad to an English speaking country. My husband and I chose a place where we could both find work. That’s why we decided to go to London. So, I took on a PhD position in Bart Vanhaesebroeck’s lab at the Ludwig Institute for Cancer Research, University College London. Bart was also such an enthusiastic researcher.

An How did you enjoy London personally?
BG London was fantastic, in terms of science and also culture. It is also a great place to meet interesting people. I still often miss its international character, the culinary choices and cultural program it has to offer.

An Does family and career leave you with some free time for yourself?
BG Our children are still young and with a full time job I really do find it hard to manage some free time for myself. Thanks to flexi-time at Roche, I have some scope to freely arrange my working day and it also greatly helps that the grandparents live in the area.

> home
...always a researcher.

The fascination hasn’t dwindled. Not even emeritus status has changed this. And so some of the former Biozentrum’s professors are still engaged in research. You can often come across them at the Biozentrum. Alumninews asked three of them about current projects, alternative research careers and pros and cons of being emeriti.

Alumninews How often do you come to the Biozentrum?
Urs Meyer Two to three days per week, sometimes more, sometimes less.

An What are you working on these days?
UM I am still intensively involved in all medical aspects of the human genome, personalized medicine and also with the digital revolution in the area of health care. I hold talks about these topics at congresses, at summer schools and continuing education lectures for medical doctors. In addition, I teach medical students in Basel and am involved in various editorial boards and several companies in an advisory function.

An If today you were at the start of your research career…
UM …I probably would concentrate on aspects of the complexity of functions of the human brain and developments in the field of artificial intelligence (AI), for instance, the application of IBM Watson in assisting in medical decision making.

An What changed with becoming an emeritus?
UM I mainly miss interacting with the many young researchers and discussing their ideas, suggestions and questions. It is also now and again somewhat frustrating to no longer personally stand in the lab and plan experiments myself.

An What do you do in your leisure time?
UM Like many other grandparents, my wife, Gabriela, and I regularly look after our grandchildren. Today we also have more time to enjoy the cultural activities that Zurich, Basel and Luzern have to offer. And when I have time I work in my workshop as a hobby sculptor on abstract body forms in plaster, clay and stone.

An Can you think of an amusing anecdote about the Biozentrum?
UM Yes, I remember the “Biocenter Rap” that the Pharmacology Department at that time presented on stage, during the 20 years Jubilee of the Biozentrum (1991). Almost everyone from the 7th floor took dancing lessons and rehearsed in the recording studio for the playback. We had many good laughs and also discovered some unexpected talents.
Anna Seelig-Löffler
Titular Professor of Biophysical Chemistry, 1972 – 2012
Anna Seelig-Löffler investigated the structure and function of cell membranes. Her work focused on membrane proteins, the so-called ABC transporters that prevent drug uptake across cell membranes and cause multidrug resistance.

Alumninews How often do you come to the Biozentrum?
Anna Seelig-Löffler Almost daily.

An What are you working on these days?
ASL I continue to work on unraveling the mechanisms of ABC (ATP Binding Cassette) transporters, in particular that of CFTR (Cystic Fibrosis Transmembrane Conductance Regulator). Cystic fibrosis results from dysfunctioning CFTR. In collaboration with a group at the University Hospital of Basel, I am also investigating the properties of Sir2tuin, a protein, which plays an important role in metabolism and the aging process.

An If today you were at the start of your research career…
ASL …I would endeavor to understand the many biochemical and genetic discoveries in the field of cell metabolism on the molecular, atomic and physical chemistry levels, in order to gain a better insight into their mechanisms, probably still with an interest in the exciting role of membranes.

An What changed with becoming an emerita?
ASL I have more time and space to delve into other scientific areas, which may not be directly related to my field of research.

An What do you do in your leisure time?
ASL As a child I spent much time reading stories, sometimes sneaking with my torch under the blankets if the story became really exciting. Today this fascination has shifted to reading and understanding “molecular stories”. Luckily my husband is more tolerant than my mother was in regard to turning off the light at night.

An Can you think of an amusing anecdote about the Biozentrum?
ASL During the establishment of the Biozentrum, there was a phase of intensive and sometimes heated discussions. But we always found a common ground. The then Secretary of the Education Department of Basel Stadt, responsible also for the University, Dr. F. Hess, expressed it like this: “The Biozentrum is an astonishing place. The professors don’t fight, they even talk with each other.”

Joachim Seelig
Professor of Structural Biology, 1972 – 2012
Joachim Seelig developed biophysical methods for the detailed measurement of the structure and the thermodynamic behavior of cell membranes. He initiated Magnetic Resonance Imaging and Spectroscopy at the University of Basel.

Alumninews How often do you come to the Biozentrum?
Joachim Seelig Every day.

An What are you working on these days?
JS On the theory of protein folding.

An If today you were at the start of your research career…
JS …I would like to combine biology, information technology and electronics.

An What changed with becoming an emeritus?
JS I no longer have teaching duties and now scientific projects that may involve some more risk have become possible.

An What do you do in your leisure time?
JS I am involved in some foundations, in the Basel Chamber of Commerce (Handelskammer beider Basel – HKBB) and in the Switzerland Innovation Park Area Basel.

An Can you think of an amusing anecdote about the Biozentrum?
JS During the establishment of the Biozentrum, there was a phase of intensive and sometimes heated discussions. But we always found a common ground. The then Secretary of the Education Department of Basel Stadt, responsible also for the University, Dr. F. Hess, expressed it like this: “The Biozentrum is an astonishing place. The professors don’t fight, they even talk with each other.”

>home
Parasites turn the wheel of world history.

World history has been shaped by invisible parasites. They put a stop to Napoleon’s desire for conquest and challenged the importance of generals. And some unobtrusive travel companions have made sure that the history of mankind had to be rewritten. Pascal Mäser, a Biozentrum alumnus and Parasitologist, views the world history from another perspective and sheds an entirely new light on it.

1492 is the year that went down in world history. On August 3rd, Christopher Columbus set sail from the Spanish mainland, with his fleet of three ships, the Santa Maria, Pinta and Niña, convinced that he would reach the Indies if he took a westerly course. Just two months later, Columbus set foot on the American continent and is since then celebrated in history as the man who discovered America. That Christopher Columbus was not the first to have reached the “New World” by sea has been exposed by a parasite: the hookworm.

*Ancylostoma duodenale* in scientific terms has accompanied mankind for almost 100,000 years. It travelled with man from Africa to Europe and Asia. But during the immigration to America via the land bridge Beringia – today’s Bering Strait – undertaken over generations, it could not follow the people. For, as the parasitologist Pascal Mäser from the Swiss TPH explains, the worm needs more than just its host to survive. “The hookworm lives in the human intestine and sucks blood from the villi. Its eggs, which are excreted in feces, develop in the soil to become infectious larvae. The larvae infect humans by penetrating the skin on the soles of the feet. The most critical point for the continuation of the infection cycle is that soil temperatures of above 20°C must prevail. Otherwise, development...
is interrupted.” During the mass migration about 15,000 years ago, the hookworm was simply left behind in the cold regions. But to the astonishment of the archaeologists, in the Peruvian Nazca Plateau about 2000 year old mummies were found that had been infected with hookworms. “Since **Ancylostoma** could not possibly have been introduced to America by the land route, people must have reached America by sea long before Columbus or the Vikings.”

1492 was a fateful year for America, in many ways. The sailors arrived not only bearing colored glass beads and gifts, they also had a stowaway on board: the pox viruses. These decimated the population of natives, who had never been exposed to these viruses before. Only a hundred years after its introduction, ninety percent of the indigenous people were dead. Whole areas were depopulated, civilizations were wiped out. Smallpox rendered the Spaniards helpless services for their conquests. “Without the devastating effects of the smallpox epidemics, the Spanish conquistadors would probably have been unable to conquer Tenochtitlan, the Aztec capital in 1521,” explains Mäser. “Hernan Cortes commanded an army of 500 soldiers, yet they managed to defeat the army of more than 200,000 Aztec men. This disease had a dramatic impact on the history of the world and in particular on the history of America.” The old world was also not spared, as on his return, Columbus carried back syphilis on his ships. Out of the blue, the epidemic spread throughout Europe. For some scholars, syphilis was a heavenly punishment for blasphemy and frivolous living on earth. Others blamed an unfavorable planetary constellation in 1484 for the outbreak. As Flavio Häner and Michael Kessler from the University of Basel’s Pharmacy Museum wrote in their book “Lust, Leid & Wissen”’ (Pleasure, pain & knowledge), syphilis appeared for the first time during the 1494 siege of Naples by Charles VIII. In the army of the French king, who was known for his sexual escapades, there were also Spanish mercenaries and “pleasure girls”. With his troops decimated by the disease, he ended the siege already after one year and sent the remaining mercenary soldiers home. They eventually spread the disease through Europe, bringing millions of people lingering illness and a painful death. Although the scholars recognized quite early on that syphilis is transmitted by coitus, there was much disagreement about whether it could also be caught in other ways, as monks and nuns were also infected by the plague. But there could be no doubt about the chastity of the members of the religious orders. This prompted the Spanish doctor Juan Almenar to write: “In most cases syphilis is caused by immoral sexual intercourse and only in the clergy due to the influence of the stars and by bad air.”

An infectious disease that costs 30,000 lives annually, even today, is yellow fever. “The pathogen is transmitted by mosquitoes, such as the Egyptian tiger mosquito,” says Mäser. “The yellow fever virus leads us to one of the darkest chapters in world history – the slave trade. In the 18th century, thousands of Africans were brought on slave ships to America. And they carried the virus in their bodies.” The infectious disease, however, could not have spread without the mosquitoes. And these they brought with them also – as larvae in the water barrels on the deck. And so both the pathogen and vector were introduced together into America, only later to thwart Napoleon’s plans to build a French empire with the capital city of “La Nouvelle-Orléans”, in North America. “Napoleon’s troops had already brought the colony Louisiana and the important port of New Orleans under French control,” relates Mäser. “But yellow fever raged among his soldiers and killed Napoleon’s most important commanders. Ultimately, he gave up the land of about two million square kilometers, which is about one quarter of the area of the present day United States, selling it all for 15 million US dollars to the United States. The Louisiana Purchase was the largest land transaction in history.”

Some eighty years later, in 1881, France experienced a similar disaster. Following the success of the Suez Canal, the undertaking by the French engineer Ferdinand de Lesseps to build the Panama Canal failed. Yellow fever took its toll on the people; every day twenty to forty workers fell victim to the virus. The sides of the channel became an endlessly long cemetery. In just seven years 50,000 people died, so the French were forced to give up the construction. It was only about 35 years later that the Americans were able to finish building the canal. Thanks to successful mosquito control.


> home
A mixture of colors.

Her world shimmers in diverse colors. Or better said her working place. Janine Zankl heads the FACS Core Facility at the Biozentrum. She brings millions of cells to glow in many different colors. The variety of colors makes it possible to analyze the cells and finally sort them. And the demand for FACS – fluorescence activated cell sorting – is huge.

Alumninews What is FACS and what can you do with this technique?
Janine Zankl FACS means fluorescence activated cell sorting. But more generalized this method is referred to as flow cytometry. The method makes two things possible: On the one hand, the qualitative and quantitative analysis of cells while they are in a fluid stream, on the other hand, the sorting of cells. For this we use two different instruments: an analyzer and a cell sorter. With the analyzer we derive the characteristics of the cells from the shape, structure and staining. Thus we can determine what types of cells are present in a solution and their proportion to each other. A cell sorter has, on top of this, a separating module. We use this device to separate the various cells according to our criteria and then we collect them in different containers.

An How do the cells get their staining?
JZ Before we analyze the cells the user has to label them. For this they use dyes for direct staining or dyes coupled to antibodies. Any dye that is excited when exposed to the available laser sources is suitable. On a routine basis we also get a lot of cells that express green fluorescent protein (GFP) or its various yellow, orange and red variants. As far as I know, it just became possible to analyze cells with up to 28 different colors at the same time. As you can see, multicolor flow cytometry is very popular.

An What happens to the cells after they have been stained?
JZ In the sorting device, the cells are in a fluid stream that passes the lasers and will break into tiny droplets afterwards. The four lasers cause the various cells to glow differently depending on the dye. When a cell that meets the sorting criteria passes by, the fluid becomes electrically charged. Droplets containing a single cell fly through an electrical field and are then diverted into different directions depending on their electrical charge. They finally land in specific collection tubes assigned for them. Within one second, up to 10 000 cells can be measured and sorted.

An For what kind of experiments is this method used?
JZ There is a huge and increasing number of different applications. Virtually every single particle that is between 200 nm and 50 µm can be analyzed by flow cytometry. Originally, flow cytometry was developed for medical diagnostics on blood cells in the fields of hematology, immunology and infectious diseases. And this is still the main approach. At the Biozentrum, FACS was initially used by the infection biologists to investigate bacteria. But today, we have an equal distribution between microbiological and cell biological applications.

An Why is there a separate service facility for FACS?
JZ First of all we take care of the maintenance, monitoring and the troubleshooting of all instruments and we provide the instruction for new users. Of course, most of the facility users operate the analyzers independently. However, from time to time also regular users need advice from us during the different steps, beginning with setting up their experiments and ranging to the statistical analysis. For researchers using the instruments only periodically or without routine, it is important that they can discuss the instrument handling with somebody. Since the sorter is a bit trickier to set up and keep in the running mode, it is usually only operated by us to ensure the correct cells are sorted.

An A look into the future: How is the method developing?
JZ In the last years, the experimental set ups became increasingly complex and diverse – not only at the Biozentrum. We are not only dealing with cell from cell cultures but more frequently also with muscle cells, neurons or stem cells from various tissues. The applications in microbiology are tending to become less, while the cell biology applications are increasing. Furthermore, FACS is becoming more colorful, meaning that we can now measure up to eight colors at the same time. I’m sure the trend towards more colors will continue. Also the equipment is developing. The devices offer more possibilities and are becoming increasingly automated.

> home
Honors.

Michael Hall awarded honorary doctorate from the University of Geneva.

The University of Geneva has awarded the biochemist Prof. Michael Hall an honorary doctorate. This distinction is in recognition of both his sustained commitment to Geneva’s university in various capacities, including serving on the Louis-Jeantet Foundation Council and the External Scientific Advisory Board of the Faculty of Medicine and his extraordinary scientific achievements. “To be recognized by one’s peers is the highest honor a scientist can receive. Of course, it is also recognition of the many talented students, postdocs and colleagues with whom I have had the good fortune to work,” says Hall. >more

T3 Pharmaceuticals wins start-up prize.

The start-up company T3 Pharmaceuticals, a spin-off of the Biozentrum, is the Business Plan winner of the competition held by Venture. The vision of the young enterprise is to improve the lives of cancer patients through innovative treatment approaches. The founder and CEO Dr. Simon Ittig and Chief Scientific Officer Dr. Christoph Kasper, both former postdocs of the Biozentrum, are developing the next generation of bacterial cancer treatments: Their method uses live bacteria that specifically infect solid tumors, fighting these with a technique developed at the Biozentrum. The prize is one of the most important distinctions for young companies in Switzerland. >more

Research.

Walking is bound hand and foot. Prof. Silvia Arber

We humans walk with our feet. This is true, but not entirely. Walking, as part of locomotion, is a coordinated whole-body movement that involves both the arms and legs. The research group of Prof. Silvia Arber now reveals that specific, long projecting neurons, traversing our spinal cord, form an important basis for the coordination of fore- and hindlimbs. These neurons couple local networks over long distances and thereby ensure posture and rhythm of our body during locomotion. In the long run, these results can be important to restore functionality after spinal cord injuries. >more
Calcium induces chronic lung infections. Prof. Urs Jenal

The bacterium *Pseudomonas aeruginosa* is a life-threatening pathogen and the leading cause of chronic lung infections in immune-compromised patients. The team of Prof. Urs Jenal has now discovered that calcium triggers the switch from acute to chronic virulence. In the chronic state, the bacteria produce a protective biofilm, reduce their growth rate and thus increase their drug tolerance and persistence. The researchers could also show that bacterial isolates from the airways of cystic fibrosis patients have retained their calcium sensitivity which allows them to adapt their virulence in response to the changing conditions in the airways. >more

Bacterial second messenger switches enzyme into “reverse gear”. Prof. Tilman Schirmer

During the cell cycle cells continuously alternate between periods of DNA synthesis and cell division. In bacteria, c-di-GMP oscillations determine when cells need to initiate the duplication of their chromosomes. In this process, the signaling molecule forces a histidine kinase to switch from “forward” into “reverse gear” and thus ultimately controls the progression of the cell cycle. The team led by Schirmer revealed that c-di-GMP stabilizes an open protein structure and thus switches the histidine kinase into “reverse gear”. In this mode the enzyme removes the phosphate groups from its target proteins, thus lifting the replication and cell division block. >more

Bacteria supply their allies with munitions. Prof. Marek Basler

Bacteria fight their competitors with molecular spear guns, the so-called Type VI secretion system (T6SS). When firing this weapon they also unintentionally hit their own kind. However, as Prof. Marek Basler reported, in contrast to their enemies the harpooned sister cells actually profit from the attack: After a T6SS injection, they are able to reuse specific proteins to produce their own spear guns. Thus the related bacterial strains help each other to enlarge their arsenal of weapons and to fight their competitors. This form of cooperation provides some bacterial communities with a survival advantage. >more

Cerebrospinal fluid signals control the behavior of stem cells in the brain. Prof. Fiona Doetsch

In the adult brain, neural stem cells give rise to neurons throughout life. These progenitor cells reside in unique micro-environments, so-called niches which provide key signals that regulate stem cell self-renewal and differentiation. Prof. Fiona Doetsch’s group uncovered that the choroid plexus, a brain structure that produces the cerebrospinal fluid (CSF), secretes a wide variety of important signaling factors in the CSF, which are important for stem cell regulation. In their study the neurobiologists showed that signals secreted by the choroid plexus dynamically change during aging which affects aged stem cell behavior. >more