Kidney—Control of Homeostasis is a Swiss research initiative, headquartered at University of Zurich, which brings together leading specialists in experimental and clinical nephrology and physiology from the universities of Bern, Fribourg, Geneva, Lausanne, and Zurich, and corresponding university hospitals.

Kidneys are not only fascinating organs, they are essential to our survival. Unfortunately, severely damaged kidneys have no capacity to regenerate. Recent achievements are fueling hope that lab-grown tissue could soon replace diseased organs.

The term ‘regenerative medicine’ is trending. Thanks to the latest technological advances, it is now possible to grow patient-specific cells into various miniature organs (organoids) in the lab. Recently, a miniature heart 3D printed from human cells was revealed to the public, and several clinical trials to treat eye disease, spinal cord injury, or Parkinson’s disease with tissue generated from patient-derived pluripotent stem cells are underway in Japan. These stunning reports raise expectations that kidneys could also soon be grown in the lab. So, what is the current state of regenerative medicine in nephrology?

More than 10 years ago, Shinya Yamanaka discovered that inserting only four genes into skin-derived cells (fibroblasts) could turn these into induced pluripotent stem cells (iPSCs). This breakthrough held the promise that iPSCs could be the building blocks of new organs of any type. The main difficulty since has been to guide iPSCs to differentiate into a desired tissue type. Persistent efforts by a number of groups around the world have recently led to the identification of conditions that guide pluripotent stem cells through a series of transformations resulting in small tissue aggregates that resemble miniature kidneys in the culture dish.
An important aspect of this has been the academic development of talented young investigators interested in kidney research. Among them is Pietro Cippà, who is currently an affiliate of the NCCR Kidney.CH. He has been a research and clinical assistant for several years at the Division of Nephrology USZ, obtaining his title of MD-PhD while working in the laboratory of Thomas Fehr. Later on he became a nephrology subspecialist while training in the clinical part of the Division. In his interview in the current newsletter, Pietro tells us more about his academic journey and his research interests.

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YOU HAVE RECENTLY BEEN APPOINTED AS AN AFFILIATE OF THE NCCR KIDNEY.CH. WHAT KIND OF SUPPORT AND OPPORTUNITIES DO YOU EXPECT?

The most important thing is for me to be part of a network of researchers, who have different competences and at the same time are all focused on the fascinating physiology and pathophysiology of the kidney. Exchanging ideas across borders is the key to moving forward in research. In addition, the NCCR Kidney.CH provides valuable tools to support the professional development of young researchers. I am glad that my collaborators in the clinic and in the lab will have access to the educational programme and to the career-related grants of the NCCR.

YOUR TIME IN THE USA WAS VERY SUCCESSFUL. WHY DID YOU DECIDE TO MOVE BACK TO SWITZERLAND?

Indeed, my stay in the USA was very productive. But when I learned about the opportunity to be appointed Head of Nephrology in Lugano, it was a chance I could not miss. With the advent of the new biomedical faculty, the health system in Ticino is experiencing a phase of growth and innovation. My goal is to contribute to this in the field of kidney research. I therefore started a new research group focused on kidney repair. I am confident that the affiliation to the NCCR will make an important contribution to this.

YOU ARE SPECIALIZED IN REGENERATIVE MEDICINE. WHAT ABOUT IT FASCINATES YOU IN PARTICULAR?

So far, we understand very little about kidney repair after injury. In fact, we are not even sure if stem cells exist in the adult kidney or if a ‘full repair’ is possible after kidney damage. At the same time, there is evidence that kidney injury can trigger a complex cascade of events, which might be beneficial in the early response but can substantially contribute to secondary tissue damage and long-term renal dysfunction. These processes are critical to the pathophysiology of progressive chronic kidney disease. The lack of understanding of these decisive biological processes of such critical clinical relevance motivates me to do research in this area. I am exploring the same problem from different perspectives in the lab and in my daily clinical work.

WHAT ARE YOUR SCIENTIFIC GOALS FOR THE NEAR FUTURE?

We are working on several projects to better understand the interaction between tissue repair and the immune system in order to find a way to prevent dysfunctional repair after acute kidney injury. I am particularly fascinated by the new level of understanding provided by single cell transcriptomics in kidney biology; potential therapeutic targets highlighted by this cutting-edge technology need to be refined and validated before moving toward clinical studies.

YOU ARE A CLINICIAN AS WELL AS A RESEARCHER. WHAT ARE THE ADVANTAGES OF THIS DUAL ROLE?

The combination of clinical work and research is challenging and requires efficient time management, a reliable team, and a dose of ‘madness’. However, it offers unique opportunities and is the best way to close the growing gap between the extraordinary discoveries in fundamental biomedical research and the lack of innovation afflicting several medical disciplines, including nephrology.
SUCCESSFUL START FOR FIRST EUKISS

About 100 scientists and clinicians attended the first European Kidney Summer School (EUKISS) at the University of Zurich from September 8 to 11, 2019. This joint initiative of the NCCR Kidney.CH, TRENAL (Translational kidney research—from physiology to clinical application), and two Kidney “Sonderforschungsbereiche” (SFB) from Germany (Regensburg and Berlin) aims to give participants insights into a wide variety of kidney functions and their relevance in renal disease.

On the programme were numerous clinical case discussions and lectures from kidney experts. In addition, the poster session offered students the opportunity to present their research projects to a wider audience. The participants particularly liked the introductory lectures as well as the opportunity to exchange and interact with the other clinicians and scientists.

Next year’s EUKISS will take place from September 2 to 5, 2020 in Berlin. The preliminary programme will soon be announced at www.eukiss.org.

CAS/DAS MODULE 5 CONCLUDED—START OF THE NEW CYCLE

The fifth and final module of the first cycle of the CAS/DAS in Translational Nephrology ended with the return session on October 17, 2019. 15 students have completed the entire course and have received the Certificate of Advanced Studies (CAS) or when additionally having published their work in a peer-reviewed journal, the Diploma of Advanced Studies (DAS) in Translational Nephrology from the University of Bern.

The programme for the third series has been slightly adapted and a sixth module, on ‘Inflammation & Immunology’ has been added. In the future, three modules will be held each year instead of two, allowing participants to complete the entire course within two years. Module 1, on ‘Salt & Water’, will start on March 27, 2020.

More information and registration at: www.nephrologie.unibe.ch

JUNIOR GRANT Awardees 2019

The Junior Grants 2019 were awarded to Daniela Egli-Spichtig (University of Zurich), Anna Keppner (University of Fribourg), and Matthias Moor (University of Bern). These young scientists will each receive CHF 60,000 per year from the NCCR Kidney.CH for up to three years. With these grants the NCCR aims to enable these promising postdocs to take their next career steps and implement their own research projects. Daniela Egli-Spichtig investigates the crosstalk between fibroblast growth factor 23 and inflammation, while Anna Keppner explores the function of androglobin in renal ciliogenesis and its involvement in polycystic kidney disease, and Matthias Moor researches the role of MEMO in bone disease during acute and chronic renal dysfunction.

IPAHK+ GOT UNDER WAY

The NCCR Kidney.CH-funded epidemiological study IPAHK− (“Incidence of Primary Aldosteronism in Hypokalemia”) started patient recruitment and enrollment by September this year. As the study title implies the project aims to identify the incidence of Primary Aldosteronism—the main endocrine cause of secondary hypertension—in patients with hypokalemia. Hypokalemia, a common feature of the disease, could help to guide clinicians in their decision-making for screening and thus improve the detection rate of this hitherto widely underdiagnose hormonal disorder. After successful implementation of the study at the University Hospital Zurich, the study will also be set up in numerous other European centers.

AWARDS TO NCCR KIDNEY.CH MEMBERS

The research and the members of the NCCR Kidney.CH are also being recognized beyond the NCCR’s network. During the 2019 congress in June, Olivier Devuyst received the renowned ERA-EDTA Award for outstanding basic science contributions to nephrology. In September 2019, the German Physiological Society awarded Carsten Wagner with the prestigious Adolf-Fick-Preis. Congratulations on these achievements!