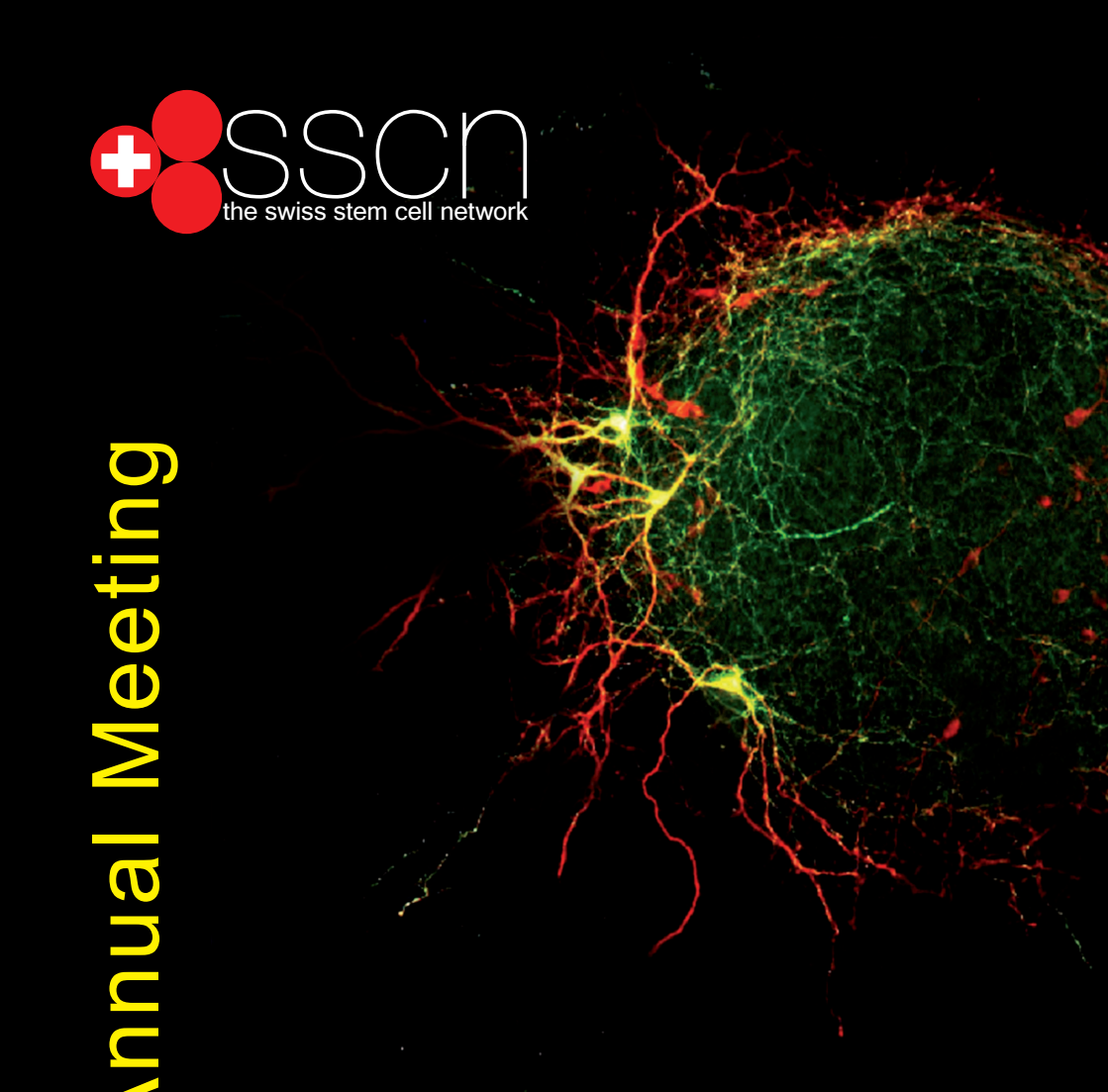
sscn
the swiss stem cell network



9th Annual Meeting

Friday, February 8th, 2013
University of Bern, Inselspital
Ettore Rossi Hall

INSELSPITAL
UNIVERSITÄTSSPITAL BERN
HOPITAL UNIVERSITAIRE DE BERNE
BERN UNIVERSITY HOSPITAL

u^b
UNIVERSITÄT BERN

Index

Organization & Scientific Advisory Board

Organizers

Daniel Surbek
Volker Enzmann
Hans Ruedi Widmer

Local Organization Committee

Neurosurgery:
Stefano Di Santo
Stefanie Seiler
Lilith Bütler
Daniela Miescher

Infectiology:
Denis Grandgirard

Prenatal Medicine:
Andreina Schoeberlein

Vetsuisse:
Eliane J. Müller
Sonja Kleinlogel

Scientific Advisory Board

Regenerative Neuroscience, University of Bern:
Daniel Surbek
Volker Enzmann
Hans Ruedi Widmer
Stephen Leib
Pascal Senn
Andreas Raabe

Department Clinical Research, University of Bern:
Hugues Abriel

Bern University Hospital:
Gabriela Baerlocher
Claudio Bassetti
Thomas Geiser

University of Bern:
Peter Gehr
Nina Ullrich

EPFL Lausanne:
Yvan Arsenijevic
Freddy Radtke

University of Basel:
Ivan Martin

Program

09.00-09.45 Registration and coffee

Session 1: Translational Stem Cell Research
Chair: Prof. Daniel Surbek

09.45-10.00 Welcome address: Urs Birchler, CEO, Inselspital, Bern University Hospital

10.00-10.45 Keynote speaker:
Zaal Kokaia, University of Lund, S
Stem cells, stroke and inflammation

10.45-11.15 Ivan Martin, University of Basel
Cartilage tissue engineering: from the nose to the knee

11.15-11.30 Isabelle Plaisance, University of Lausanne
Control of lineage specification by the notch pathway in human cardiac precursor cells

11.30-12.00 Olga Shakhova, University of Zurich
Melanoma biology: lessons from stem cells

12.00-13.30 Lunch (Foyer) and poster session (Room 1)

Industry talks in the Auditorium

12.30-13.00 Alexandra Blak (Stemcell Technologies): TeSR™-E8™: Simplified, low protein maintenance medium and the integration of hESC/hiPSC culture systems

13.00-13.30 Mark Lynch (Fluidigm Europe): Exploring single cell genomics with the C1™ Single-Cell Auto Prep System from Fluidigm

Session 2: Regenerative Neuroscience & Stem Cells
Chair: PD Volker Enzmann

13.30-14.00 Morten Meyer, Odense, DK
Dopaminergic differentiation of human neural stem cells: effect of levodopa

14.00-14.30 Mike Karl, Dresden, D
Age-dependent neuronal regeneration of mouse retina

14.30-14.45 Raphael Guzman, University of Basel
Cell transplantation for spinal cord injury: from bench to bedside

14.45-15.00 Craig Nowell, EPFL Lausanne
Notch1 maintains corneal epithelial identity by attenuating AP-1 mediated inflammation

15.00-15.45 Coffee break, poster session (Room 1)

Session 3: General Stem Cells Topics
Chair: Prof. Eliane J. Müller

15.45-16.00 Marisa Jaconi, University of Geneva
Modeling early heart development in Down Syndrome using sibling hESC lines

16.00-16.15 Marta Roccio, University of Bern
Predicting stem cell fate changes by differential cell cycle progression patterns

16.15-16.45 Eliane J. Müller, VetSuisse, Bern
Intercellular adhesion balances quiescence versus activation in skin stem cells

16.45-17.30 Keynote speaker:
Dirk Schübeler, FMI University of Basel
Instructing the epigenome in stem and differentiated cells

17.30 Poster Price:
Peter Eggli, Medical Faculty, University of Bern

Concluding remarks:
Daniel Surbek, Volker Enzmann, Hans Rudolf Widmer

Speakers‘ abstracts

10.00-10.45 Stem cells, stroke and inflammation

Zaal Kokaia

Lund Stem Cell Center, University Hospital, Lund, Sweden

Email: zaal.kokaia@med.lu.se

Stem cells can be used to generate neurons and glia cells that are lost in neurodegenerative diseases. Besides cell replacement, stem cell-based approaches improve function in animal models by remyelination, trophic actions, and modulating inflammation. Endogenous neural stem cells are novel therapeutic targets because they produce neurons and glia in response to injury and could be affected by the degenerative process. During this process of maturation and functionally integration of new neurons derived from grafted stem cells or endogenous sources numerous choices are made, such as proliferation or quiescence, cell survival or death, migration or establishment, growth or retraction of processes, synaptic integration, or tuning of synaptic transmission. Microglia are located within the neurogenic niches and as well as in the are where newly form cells migrate. In addition, there is infiltration of immune cells from the blood towards the damaged tissue and formation of macrophages. Activated microglia and monocyte-derived macrophages became interesting candidates for modulating neurogenesis in injured brain. Most studies report an acute decrease in the survival of new neurons caused by molecules released from classically activated microglia. However, microglial activation and effect of macrophages are more heterogeneous and the transformation from a pro- to an anti-inflammatory cytokine profile and the deactivation of microglia is not well defined. Significant hurdles remain before these findings can be responsibly translated to novel therapies for patients with neurodegenerative disorders. In particular, we need to learn how to control stem cell proliferation, survival, and migration in the pathological environment. Before clinical trials with stem cell-based approaches are initiated, we need to know to a much greater extent how to control stem cell differentiation into specific phenotypes, induce their integration into existing neural and synaptic circuits, and optimize the functional recovery in animal models of neurodegenerative disorders.

10.45-11.15 Cartilage tissue engineering: from the nose to the knee

Ivan Martin

Departments of Surgery and of Biomedicine, University Hospital Basel, Switzerland

Email: ivan.martin@usb.ch

In embryonic transplantation models, mesenchymal cells derived from the neural crest (‘mesectoderm’) have a unique regenerative capacity and developmental plasticity, associated with a ‘Hox-negative’ profile. In adult mice, mesectoderm- but not mesoderm-derived skeletal stem cells can adopt the Hox-positive status of heterotopic transplantation sites, leading to robust tissue repair. However, it remains unknown whether developmental origin and Hox-negativity are associated with regenerative capacity and plasticity also in differentiated cells from developed individuals. Here it is shown that adult human mesectoderm-derived nasal chondrocytes (NC) can be constitutively distinguished from mesoderm-derived articular chondrocytes (AC) by the lack of expression of specific HOX genes (e.g., HOXC4, HOXD8). In contrast to AC, NC can be extensively cultured and serially cloned while conserving the ability to form cartilage tissue. NC can also stably adopt a Hox-positive profile typical of AC upon implantation into articular cartilage defects and directly contribute to their repair. Hence, HOX-negative differentiated mesectoderm cells in adult individuals retain a previously unrecognized self-renewal capacity and degree of plasticity, typical of embryonic- or stem-cell systems.

The study highlights the relevance of NC as a possible cell source for cell- or tissue-therapy in regenerative medicine, also in view of their easy availability in an autologous setting. In the field of cartilage tissue engineering, the results reinforce previous findings on the more reproducible re-differentiation and cartilage forming capacity of human NC, not exposed to degenerative processes, as compared to AC from age-matched donors or in an isogenic setting. The proof of principle that autologous NC can participate in the repair of articular cartilage defects in a goat animal model, combined with the previous demonstration that NC favourably respond to mechanical forces typical of joint loading and can recover from inflammatory processes, supports their clinical test for articular cartilage repair. Indeed, also based on the here presented findings, the Basel University Hospital has recently started a first-in-man phase I clinical study to treat traumatic knee joint defects with cartilaginous constructs generated from autologous NC (http://clinicaltrials.gov Identifier: NCT01605201).

11.15-11.30 Control of lineage specification by the notch pathway in human cardiac precursor cells

Isabelle Plaisance

Experimental Cardiology Unit, Department of Medicine, University Hospital Lausanne, Switzerland

Email: isabelle.plaisance@chuv.ch

The regenerative potential of the heart relies on a pool of cardiac precursor cells (CPCs). However, the pathways that are required for the mobilization, expansion and commitment of CPCs have not been identified. In the present study, we evaluated whether the Notch pathway was implicated in the commitment and differentiation of human fetal and adult CPCs. Fetal CPCs were obtained from ventricles at 12 to 14 weeks of gestation whereas adult CPCs from right atrial appendages of cardiac patients undergoing surgery. Isolated fetal and adult CPCs demonstrated identical cell surface phenotype, characterized by no expression of hematopoietic markers (CD45) and endothelial stem cell markers (CD34 and CD31), and expression of mesenchymal stem cell markers (CD73, CD90 and CD105). Furthermore, both CPCs expressed early cardiac markers such as Nkx2.5, GATA4 and Mef2c but no late cardiac markers expressed in functional cardiomyocytes. The two populations differ in their cardiogenic potential. In vitro, a large percentage of fetal CPCs differentiate into functional cardiomyocytes and to a lesser extent into smooth muscle cells whereas adult CPCs gave rise essentially to smooth muscle cells. To test their cardiogenic potential in vivo, CPCs were injected into SCID neonates via the temporal vein. Both fetal and adult human cells were detected in the murine heart, and appeared to differentiate into cardiomyocytes. This indicates that, if transferred into the appropriate environment, adult CPCs revealed their cardiogenic potential. The Notch pathway plays crucial roles in the development of cardiovascular system and is still highly activated during the first weeks of age. In order to test whether the Notch pathway could be used to force adult CPCs into the cardiogenic lineage, CPCs were stimulated in vitro using immobilized Notch ligands, i.e. either Jagged 1 or Delta-like-1. In fetal CPCs, both Jagged1 and Delta-like-1-mediated Notch activation increased proliferation and early cardiac gene expression (NKx2.5, GATA4 and Mef2C). In adult CPCs, activation of the Notch pathway using Jagged1 increased the level of Nkx2.5 expression (but not GATA4 or Mef2c) without stimulating proliferation. In contrast, Delta-like1 stimulated proliferation as well as GATA4 and Mef2c expression (but not Nkx2.5). To determine whether the increase in cardiac transcription factor expression reflected a concomitant increase in the number of CPCs, cells were switched to a differentiation medium following stimulation by either Jagged1 or Delta-Like1. Indeed, data indicated that the net production of differentiated cardiomyocytes was increased after transient Notch activation. Altogether, these results indicate that the Notch pathway could be used to reactivate the cardiogenic potential of human adult CPCs.

11.30-12.00 Melanoma biology: lessons from stem cells

Olga Shakhova

Cell and Developmental Biology, Institute of Anatomy, University of Zurich, Switzerland

Email: olga.shakhova@anatom.uzh.ch

Patients with giant congenital nevi are at high risk for developing melanoma, the most aggressive skin cancer. The precise molecular and cellular mechanisms of this malignancy remain to be further characterized. We have recently identified the crucial role of the neural crest transcriptional factor Sox10 in melanoma formation and demonstrated that interfering with Sox10 levels counteracts NrasQ61K-driven melanoma in vitro and in vivo. Microarray analysis of the putative Sox10 target genes revealed that another member of the Sox gene family, Sox9, was upregulated upon Sox10 loss, suggesting a potential role of Sox9 in preventing melanoma development. To address this, we have conditionally inactivated simultaneously both Sox10 and Sox9 in the melanocytic lineage of Tyr::NrasQ61K mice and observed the restoration of the characteristic hyperpigmentation phenotype in the Tyr::NrasQ61K mice even in the absence of Sox10. Furthermore, in the vast majority of human melanoma samples analyzed expression of Sox10 and Sox9 was mutually exclusive. Taken together these findings establish the importance of an antagonistic action of Sox10 and Sox9 as functional regulators of melanoma development.

13.30-14.00 **Dopaminergic differentiation of human neural stem cells: effect of levodopa**

Morten Meyer

Department of Neurobiology Research, Institute of Molecular Medicine, University of Southern Denmark, Denmark

Email: mmeyer@health.sdu.dk

Idiopathic Parkinson’s disease (PD) is characterized by progressive degeneration of melanin containing dopaminergic neurons in substantia nigra pars compacta in the upper brain stem. The loss of dopaminergic neurons results in a gradual decrease of striatal dopamine levels, typically leading to rigidity, tremor, hypokinesia and postural instability.
Although direct dopamine receptor agonists are frequently used in treatment of PD, the most effective drug to elicit an improvement of the motor symptoms remains levodopa (3,4-dihydroxyphenylalanine).
One of the prospects for a curative treatment for PD is to replace the lost midbrain dopaminergic neurons. Preclinical and clinical trials have demonstrated that fetal dopaminergic neurons have the potential to markedly improve motor function in animal models and patients. However, this source of cells will never be sufficient to use as a widespread therapy. Over the last 20 years, scientists have been searching for other reliable sources of dopamine neurons, and stem cells are strong candidates.
Our research is focussed on -1) experimental in vivo and in vitro studies of midbrain dopaminergic neuron development, -2) regulation of neural stem cell proliferation, migration and dopaminergic differentiation, -3) neurotrophic factors and neuroplasticity in the nigrostriatal system, and -4) cell replacement strategies for treatment of PD.
My presentation will cover our recent and ongoing stem cell research with particular focus on dopaminergic differentiation strategies and the effect of levodopa.

14.00-14.30 **Age-dependent neuronal regeneration of mouse retina**

Mike Karl

CRTD/DFG-Center for Regenerative Therapies, Dresden, Germany

Email: mike.karl@crt-dresden.de

In adult mammalian vertebrates spontaneous retina regeneration is absent and in species like fish and birds Müller glia cells de-differentiate into progenitor-like cells, which regenerate up to all types and numbers of retinal neurons. Recent studies showed that in rodent retina a regenerative program could be reactivated in and ex vivo. We investigated the age-dependence of Müller glia reprogramming into an adult stem cell state as well as their potential to regenerate neuronal progeny. After retinogenesis is complete the still young Müller glia de-differentiate and re-enter the cell cycle at higher numbers compared to the adult retina. Within a few days the Müller glia adult stem cell competence is reduced to levels comparable to previously published results in the adult mouse retina in vivo. Our data suggest that a defined developmental program restrict the Müller glia regenerative capacity within a week after end of retinogenesis. Interestingly, conditional transgene expression of SV40-large t-antigen in mouse retina ex vivo overcomes some of the restriction of Müller glia proliferation. We are currently investigating the underlying mechanisms that age-dependently restrict retina regeneration.

14.30-14.45 Cell transplantation for spinal cord injury: from bench to bedside

Raphael Guzman

Department of Neurosurgery, University of Basel, Switzerland

Email: raphael.guzman@usb.ch

Pre-clinical studies have demonstrated successful stem cell transplantation in experimental spinal cord injury models. Using human central nervous system derived neural stem cells cellular integration with regenerative capacity has been shown. Long term survival of transplanted cells at 16 weeks with significant motor function improvement was described. These studies have laid the foundation for an international Phase I clinical stem cell trans-plantation trial in patients with thoracic spinal cord injury. In this talk I will review part of the preclinical data, describe the trial design and present some oft the 6 months clinical outcome results.

14.45-15.00 Notch1 maintains corneal epithelial identity by attenuating AP-1 mediated inflammation

Craig Nowell

EPFL, School of Life Sciences, Swiss Institute for Experimental Cancer Research, Lausanne, Switzerland

Email: craigscott.nowell@epfl.ch

The cornea is an avascular tissue consisting of a self-renewing, stratified epithelium with an underlying stroma containing keratocyte fibroblast cells and parallel arrays of collagen fibres. In response to injury, the corneal epithelium can be repaired by resident corneal epithelial stem cells, which in humans are enriched at the limbus. However, in circumstances where corneal epithelial stem cells are depleted, such as in patients with severe bi-lateral burns, this regenerative capacity is lost and vision is impaired. Thus, strategies aimed at generating corneal epithelial cells from other types of epithelial tissue are of clinical relevance. In a recent study, the role of Notch1 in the corneal epithelium was addressed by conditionally deleting Notch1 in stratified epithelial tissues including the cornea. In the absence of Notch1, the homeostatic maintenance of the corneal epithelium is normal. However, during wound repair, the corneal epithelium undergoes a fate switch to epidermis. Interestingly, this squamous cell metaplasia occurs in a non-cell autonomous manner and is associated with changes in the underlying stroma that subsequently induce the corneal to epidermal fate switch. Identification of the cellular and molecular factors which induce both the stromal remodeling and the epidermal fate conversion will reveal novel insights into the role of Notch in stratified epithelial tissues and raises the possibility of inducing reciprocal fate switches in stratified epithelial cells from other tissues. Here, we demonstrate that the absence of Notch1 in the corneal epithelium results in a chronic inflammatory response during wound repair due to unattenuated expression of pro-inflammatory mediators such as c-jun/AP-1. As a secondary effect of chronic inflammation, specific signaling pathways, including wnt/β-catenin, are elevated, resulting in fate conversion to epidermis. Collectively, these data identify Notch as a key regulator of inflammation in stratified epithelia and suggest that elevated wnt signaling imposes epidermal identity on corneal epithelial progenitor/stem cells.

15.45-16.00 **Modeling early heart development in Down Syndrome using sibling hESC lines**

Marisa Jaconi

Pathology and Immunology, University of Geneva, Switzerland

Email: marisa.jaconi@unige.ch

Human embryonic stem cells (hESC) carrying known diseases provide excellent models for examining the cellular consequences of a disease from the earliest time in development. Due to differing genetic backgrounds, however, hESC lines are known to display intrinsic differences in their differentiation capacities and epigenetic patterns. These genetic differences result in significant differences upon differentiation, thus making it difficult to detect small variations between diseased and control lines. Using a hESC sibling model of disease provides a more sensitive approach to detecting small variations due to greater genetic similarity. In this study, we have isolated and characterized a trisomy 21 (T21) hESC model of Down syndrome (DS) using sibling hESC lines as controls. As congenital heart defects (CHD) are the leading cause of morbidity DS, we examined the genetic pathways associated with cardiogenesis to ascertain perturbations in development which may lead to CHD. Upon differentiation, T21-hESC show many significant differences in expression of genes associated with both mesodermal and cardiac development, which is particularly evident with genes associated to the secondary heart field (SHF).
Additionally, genes of the T-box transcription factor family were found to be significantly over-expressed in T21-hESC. Some of these perturbations also coincide with known causative genes for CHD observed in the general population.
Furthermore, we identified at least one gene located on chromosome 21 which may account for some of these perturbations. Therefore, our work shows for the first time, that T21-hESC and their sibling control lines are a useful model facilitating the identification of differentially expressed genes associated with early cardio genesis, which may underlie the cause of CHD observed in DS.

16.00-16.15 **Predicting stem cell fate changes by differential cell cycle progression patterns**

Marta Roccio

Department of Clinical Research, University of Bern, Switzerland

Email: marta.roccio@dkf.unibe.ch

Stem cell self-renewal, commitment and reprogramming rely on a poorly understood coordination of cell cycle progression and execution of cell fate choices. Using existing experimental paradigms it has not been possible to probe this relationship systematically in live stem cells in vitro or in vivo. Alterations in stem cell cycle kinetics probably occur long before changes in phenotypic markers are apparent and could be used as predictive parameters to reveal changes in stem cell fate. To explore this intriguing concept, we developed a single-cell tracking approach that enables automatic detection of cell cycle phases in live (stem) cells expressing fluorescent ubiquitylation-based cell-cycle indicator (FUCCI) probes. Using this tool, we have identified distinctive changes in lengths and fluorescence intensities of G1 (red fluorescence) and S/G2-M (green) that are associated with self-renewal and differentiation of single murine neural stem/progenitor cells (NSCs) and embryonic stem cells (ESCs). We further exploited these distinctive features using fluorescence-activated cell sorting to select for desired stem cell fates in two challenging cell culture settings. First, as G1 length was found to nearly double during NSC differentiation, resulting in progressively increasing red fluorescence intensity, we successfully purified stem cells from heterogeneous cell populations by their lower fluorescence. Second, as ESCs are almost exclusively marked by the green (S/G2-M) FUCCI probe due to their very short G1, we substantially augmented the proportion of reprogramming cells by sorting green cells early on during reprogramming from a NSC to an induced pluripotent stem cell state.
Taken together, our studies begin to shed light on the crucial relationship between cell cycle progression and fate choice, and we are convinced that the presented approach can be exploited to predict and manipulate cell fate in a wealth of other mammalian cell systems.

16.15-16.45 **Intercellular adhesion balances quiescence versus activation in skin stem cells**

Eliane J. Müller

Molecular Dermatology and Stem Cell Research, Vetsuisse Faculty, University of Bern, Switzerland

Email: eliane.mueller@vetsuisse.unibe.ch

The outmost layer of the skin, the epidermis as well as its appendages are renewed throughout life-time. This process relies on cyclic activation and proliferation of epidermal progenitor or stem cells (SC) which reside in compartments such as the basal epidermis and distinct areas of the hair follicle (HF). Adhesion disrupting antibodies against the desmosomal cadherin Dsg3, which are characteristically produced in the autoimmune blistering disease Pemphigus vulgaris (PV), were observed to preferentially home to these SC compartments. There, they impair cell-cell adhesion and induce proliferation, consistently observed in PV mouse models as well as human PV patients.
Using these PV models, our studies let us to identify a number of activation and remodeling mechanisms triggered by disrupted Dsg3 adhesion. In the epidermis and/or epidermally-derived keratinocytes, c-Myc is upregulated via a process involving depletion of the transcriptionally active armadillo protein plakoglobin followed by an accelerated outward migration and evacuation of surplus keratinocytes at the epidermal surface. In the resting multipotent HFSC niche (telogen), deep in the epidermis, the antibody-triggered SC proliferation correlated with downregulation of the bulge “stemness signature” and a reduction of label retaining cells, consistent with loss of quiescence and SC activation. However, HFSC were not permanently lost due to a mechanism precluding de novo HF induction.
Our data suggest that Dsg3 adhesion governs progenitor and SC quiescence and its loss results in cellular activation and proliferation which is dealt with in distinct ways by each progenitor and stem cell niche. We will discuss a model in which desmosomal cadherins are key regulators of tissue homeostasis, both i) mechanically, through maintaining cell-cell adhesion and ii) biochemically, through their function as signal transducers.

16.45-17.30 **Instructing the epigenome in stem and differentiated cells**

Dirk Schübeler

Friedrich Miescher Institute for Biomedical Research, Basel, Switzerland

Email: dirk.schubeler@fmi.ch

Chromatin and DNA modifications have emerged as a critical component for gene regulation in higher eukaryotes. Yet how these epigenetic variables are targeted to specific sites of the genome and how they influence cellular potential and identity is still poorly understood. We have generated global maps of DNA methylation, histone modifications and replication in higher eukaryotes using stem cell differentiation as a dynamic cellular model for pluripotency, lineage commitment and terminal differentiation.
This analysis allowed us to identify genomic sites that change their epigenetic status cell-state specific. Based on the resulting datasets we generate models how these epigenetic variables are targeted, which we test by genetic perturbation of involved modifiers and mutation of putative recruiting elements.
Our results suggest that the actual DNA sequence of regulatory regions is a key determinant of their DNA methylation state, a finding, which will be discussed in the light of current models of the function of epigenetic restriction during development.

Posters

Translational Stem Cell Research

01 Control of lineage specification by the notch pathway in human cardiac precursor cells
Isabelle Plaisance, Stephanie Perruchoud, Christine Gonzales, Patrick Ruchat, Andrée Porret and Thierry Pedrazzini

02 Sustained and highly tunable delivery of engineered VEGF164 from optimized fibrin matrices ensures normal, stable and functional angiogenesis
Sacchi Veronica, Mittermayr Rainer, Hartinger Joachim, Martino Mikael, Morton Tatjana, Hofmann Anna, Largo Remo, Marshall Jeff, Groppa Elena, Gianni-Barrera Roberto, Ehrbar Martin, Hubbell Jeffrey, Redl Heinz, Banfi Andrea

03 New role for the Notch-ligand Jagged1 in the adult heart
Melanie Metrich, April Bezdek Pomey, Corinne Berthonneche, Mohamed Nemir, Thierry Pedrazzini

04 Controlled VEGF expression by transduced and FACS-purified mesenchymal progenitors ensures safe angiogenesis and functional improvement in a model of myocardial infarction
Melly L, Marsano A, Helmrich U, Heberer M, Eckstein F, Carrel T, Cook S, Giraud MN, Tevaearai, Banfi A

05 Thermo-reversible hydrogel / mesenchymal stem cell Injection approach for nucleus pulposus replacement: feasibility under static loading in a papain-induced disc degeneration model
Cherry Malonzo, Samantha Chan, David Eglin, Sibylle Grad, Harald M Bonél, Lorin M Benneker, Benjamin Gantenbein-Ritter

06 Induced pluripotent stem cells (iPS) attenuate fibrosis in bleomycin injured rat lungs
Gazdahar Amiq, Gard Iwona, Gugger Matthias, Anis Feki, Geiser Thomas

Regenerative Neuroscience & Stem Cells

07 The role of β-catenin in the development of neural crest stem cells
Max Gay, Tomas Valenta, Lisette Hari, Konrad Basler and Lukas Sommer

08 Invitro differentiation of human bone marrow-derived stem cells towards retinogenic fate
Mathivanan Isai, Balmer Jasmin, Tamò Luca, Enzmann Volker

09 Optimization of the human-Chorion derived Mesenchymal Stem Cells for Neuroregeneration to treat Pre- and Perinatal Diseases
Periasamy Ramesh, Messerli Marianne, Schoeberlein Andreina, Sager Ruth, Surbek Daniel

10 Therapy of perinatal brain damage by transplantation of human umbilical cord-derived mesenchymal stem cells in a rat model
Andreina Schoeberlein, Martin Müller, Ursula Reinhart, Marianne Messerli, Ruth Sager, Daniel V. Surbek

11 The role of Ski in neurogenesis
Dittrich Manuela, Baranek Constanze, Atanasoski Suzana

12 Adult neurogenesis in Drosophila
Ismael Fernández-Hernández, Christa Rhiner and Eduardo Moreno

13 Derivation of traceable photoreceptors from embryonic stem cells
Decembrini Sarah, Koch Ute, Radtke Freddy, Arsenijevic Yvan

14 Ezh2 regulates neural stem cell fates in the developing mouse midbrain
Martina Zemke, Kalina Draganova, Haruhiko Koseki and Lukas Sommer

15 What is the benefit of grafting bone marrow derived stem cells (BMSC) into the hippocampus after bacterial meningitis?
F. D. Liechti, S. Hofer, D. Grandgirard, S.L. Leib

16 Evaluation of the mood-stabilizer Lithium on acute brain injury in experimental pneumococcal meningitis
Nicolas Stüdle, Fabian D. Liechti, Denis Grandgirard, Wolfgang Thormann, Stephen L. Leib

17 Effects of GHB and baclofen on sleep and motor function in healthy rats and rats with focal cerebral ischemia
A. Hodor, S. Palchykova, B. Gao and C.L. Bassetti

18 Intraventricular infusion of endothelial progenitor cell conditioned medium promotes endogenous neurogenesis.
Nicole Porz, Stefanie Seiler, Alessandro Putzu, Robert Andres, Andreas Raabe, Hans R. Widmer and Stefano Di Santo

19 From blood to brain: contribution of endogenous bone marrow-derived mesenchymal stem cells to brain repair after stroke
Robert H. Andres, Alex Filatenkov, Jeanette Baker, Raphael Guzman, Hans R. Widmer

20 The role of Wnt signaling in regulating radial migration and positioning of late-generated pyramidal neurons
Michael Boitard, Volodymyr Petrenko, Kristof Egervari, Jevgenia Mihhailova, Riccardo Bocchi, Selenz Christina, Patrick Salmon, and Jozsef Z. Kiss

21 A new behavioral analysis in rats to understand motor fluctuations in parkinsonian patients treated with L-DOPA
Stefania Sgroi, Alain Kaelin-Lang and Christine Capper-Loup

22 Inner ear stem cells for tissue regeneration of the auditory organ
Roccio M., Hahnewald S., Senn, P.

23 Human Wharton's jelly-derived mesenchymal stem cells express neurotrophic factors in vitro
Marianne Messerli, Andreina Schoeberlein, Ruth Sager, Daniel V. Surbek

Posters

General Stem Cell Topics

24 ARTD1 mediated activation of FGF4 transcription is crucial for the initiation of reprogramming
Fabienne A. Weber, Giody Bartolomei, Michael O. Hottiger and Paolo Cinelli

25 Effects of stress exposure on heart regeneration in zebrafish
Pauline Sallin and Anna Jazwinska

26 Inflammation alone is sufficient to switch cardiomyocyte proliferation in the adult zebrafish heart
Felix Baier, Pauline Sallin and Anna Jazwinska

27 Functional characterization of stem cell-derived cardiomyocytes
Irene C. Marcu, Pernilla Hoffmann, Marisa Jaconi, Nina D. Ullrich

28 Identification of epithelial stem cells in rodent incisors
Granchi Z., Graf D., Alexiou M., Barrandon Y., Rochat A., Claudinot S., Stolf D., Mitsiadis T.A.

29 An in vitro expansion score for tissue engineering applications with human bone marrow derived mesenchymal stem cells
Alessandro Bertolo, Marco Mehr, Tiziana Janner-Jametti, Ursula Graumann, Niklaus Aebli, Martin Baur, Stephen J. Ferguson, Jivko Stoyanov

30 The role of Nogo-A in orofacial development and regeneration
Pagella Pierfrancesco, Winkler Kristian, Alexiou Maria, Graf Daniel, Schwab Martin, Mit-siadis Thimios

31 FGF signaling promotes actinotrichia formation during zebrafish fin regeneration
Chassot Bérénice, Page Lionel, Jazwinska Anna

32 Wild-type ALK and both ALK-R1275Q and ALK-F1174L activating mutations display oncogenic activity in murine neural crest progenitor cells
Annick Mühlethaler-Mottet, Gisèle Montavon, Aurélie Coulon, Marjorie Flahaut, Katia Balmas Bourloud, Katya Nardou, Nicolas Jauquier, Jean-Marc Joseph, Pu Yan, Olivier Delattre, Lukas Sommer, Isabelle Janoueix-Lerosey, and Nicole Gross

33 Identification of Hes1 target genes in murine and human T-ALL
Silvia Wirth, Agnieszka Wendorff, Ute Koch and Freddy Radtke

34 Influence of ALDH activity in the stem cell properties of Neuroblastoma cells
Marjorie Flahaut, Nicolas Jauquier, Annick Mühlethaler-Mottet, Jean-Marc Joseph and Nicole Gross

35 Tooth abnormalities in FGFR1/FGFR2 double mutants
Anna Filatova, Lucia Jimenez Rojo, Thimios Mitsiadis

36 Non-viral gene transfer of growth and differentiation factor 5 (GDF-5) to primary human mesenchymal stem cells – A path to gene therapy for degenerative disc disease?
Christian Bucher, Amiq Gazdhar, Lorin M Benneker, Thomas Geiser and Benjamin Gantenbein-Ritter

37 Promotion of angiogenesis of brain endothelial cells by conditioned medium treatment critically involves the PI3-kinase pathway
Anna Lena Fuchs, Jennifer Staudigl, Stefanie Seiler, Nicole Porz, Hans R. Widmer, Stefano Di Santo

38 Forkhead transcription factor Foxk2 – a guardian of long-term hematopoietic stem cells
Fasnacht Nicolas, Lorini Doris, Dubey Christelle and Radtke Freddy

All abstracts are available under www.stemcellsbern.ch

Participants

Aguettand	Olivier	Biolabo SA
Agyeman	Philipp	Institute for Infectious Diseases, University of Bern
Alexiou	Maria	Oral Biology, University of Zurich
Andres	Robert H.	Neurosurgery, Inselspital, Bern University Hospital
Antoine	Peters	FMI, University of Basel
Arsenijevic	Yvan	Hôpital Jules-Gonin, Université de Lausanne
Atanasoski	Suzana	University of Basel
Baggiolini	Arianna	Anatomy, University of Zurich
Bahrenberg	Gregor	CABMM, University of Zürich
Baier	Felix	Zoology, University of Fribourg
Balmer	Jasmin	Ophthalmology, Inselspital, Bern University Hospital
Banfi	Andrea	Basel University Hospital
Barth	Lydia	Biozentrum, University of Basel
Batel	Sameera	Labortierkunde, University of Zurich
Batifort	Veronique	Merck Millipore
Beauchamp	Philippe	DKF Cardiology, University of Bern
Bertolo	Alessandro	Swiss Paraplegic Research, Nottwil
Bezdek Pomey	April	Experimental Cardiology, University Hospital CHUV
Blak	Alexandra	STEMCELL Technologies
Boitard	Michael	CMU, University of Geneva
Boryana	Petrovka	University of Geneva
Brégère	Catherine	University of Basel
Bucerius	Roman	STEMCELL Technologies
Bucher	Christian	Surgical Technology and Biomechanics, University of Bern
Bütler	Lilith	Inselspital, Bern University Hospital
Capossela	Simona	Swiss Paraplegic Research, Nottwil
Capper	Christine	Neurology, Inselspital, Bern University Hospital
Catros	Sylvain	University of Bordeaux
Centola	Matteo	ICFS - University Hospital Basel
Chan	Samantha CW	Surgical Technology and Biomechanics, University of Bern
Chassot	Bérénice	Zoology, University of Fribourg
Chicha	Laurie	University of Basel
Ciaudo	Constance	ETH Zurich
Ciepielewski	Daniel	Nikon AG
Cinelli	Paolo	Trauma Surgery, University Hospital Zurich
Decembrini	Sarah	Unit of Gene Therapy & Stem Cell Biology, Lausanne
Deogracias	Ruben	Biozentrum, University of Basel
Di Santo	Stefano	Neurosurgery, Inselspital, Bern University Hospital
Diaz Romero	Jose	OARG, University of Bern
Diom	Fama	Biomedical Engineering, University of Bern
Dittrich	Manuela	Institute of Physiology, University of Basel
Dumouchel	Julien	LOT-QuantumDesign AG
Duquet	Arnaud	University of Geneva Medical School
Eggli	Peter	University of Bern
Egli	Rainer	Department of Clinical Research, University of Bern
Enzmann	Volker	Ophthalmology, Inselspital, Bern University Hospital
Fasnacht	Nicolas	SV ISREC EPFL Lausanne
Fernandez-Hernandez	Ismael	Institute of Cellbiology, University of Bern
Feutz	Anne-Catherine	ZLF Biomedicine Department, University of Basel
Filatova	Anna	Institute of Oral Biology, University of Zurich
Fisch	Urs	Clinical Neuroscience,University of Basel
Flahaut	Marjorie	University Hospital CHUV
Fontana	Chiara	Neurosurgery, Inselspital, Bern University Hospital
Forterre	Simone	Vetsuisse Fakulty, Small Animal Clinic, University of Bern
Frenz	Martin	Department of Clinical Research, University of Bern
Fritsch	Kristin	Hematology, University Hospital Zurich
Fuchs	Anna-Lena	Neurosurgery, Inselspital, Bern University Hospital
Furrer	Tino	Nikon AG
Galichet	Arnaud	Institute of Animal Pathology, University of Bern
Gantenbein	Benjamin	Surgical Technology & Biomechanics, University of Bern
Gay	Max	Institute of Anatomy, University of Zurich
Gazdhar	Amiq	Pulmonary medicine, University of Bern
Gehr	Peter	University of Bern
Geiser	Thomas	Pulmonary Medicine, Inselspital, Bern University Hospital
Gerosa	Rahel	Hematology, University Hospital Zurich
Ghafoor	Soleen	Department of Clinical Research, University of Bern
Gianluca	Civenni	Experimental Oncology, University of Bern
Girling	Peter	CELLnTEC
Glanz	Stephan	CABMM, University of Zurich
Graf	Daniel	Institute of Oral Biology, University of Zurich
Granchi	Zoraide	Institute of Oral Biology, ZZM, University of Zürich
Grandgirard	Denis	Institute of Infectious Diseases, University of Berne
Guzmann	Raphael	University of Basel
Häberli	Andre	University of Bern
Hahnewald	Stefan	ARTORG, University of Bern
Hall	Sean	University of Bern
He	Zhaoyue	Pharmacology, University of Bern
Heller	Manfred	DCR, University of Bern
Hensel	Janine	DKF Urology, University of Bern
Herrera	Pedro L.	Faculty of Medicine, University of Geneva
Hirschy	Alain	Miltenyi Biotec GmbH
Hodor	Aleksandra	Neurology, Inselspital, Bern University Hospital
Inäbnit	Walter	Haag-Streit
Jaconi	Marisa	Geneva University

Participants

Jain	Chhavi	EPFL Lausanne
Jain	Chhavi	EPFL Lausanne
Jaiswal	Sumit	Department of Biomedicine, University of Basel
Janner	Tiziana	Swiss Paraplegic Research, Nottwil
Jazwinska	Anna	University of Fribourg
Jimenez	Lucia	University of Zürich
Karl	Mike	Dresden, D
Keogh	Adrian	DKF Visceral Surgery, University of Bern
Kirkland	Susan	Novartis Institutes for Biomedical Research
Kleinlogel	Sonja	Vetsuisse Fakulty / Physiology, University of Bern
Koch	Ute	SV ISREC EPFL Lausanne
Kokaia	Zaal	University of Lund
Kozlova	Anastasiia	Institute of Oral Biology, University of Zurich
Künzler	Michael	Orthopaedics & Trauma, Inselspital, Bern University Hospital
Leib	Stephen	Institute for Infectious Diseases, University of Bern
Leni	Zaira	Department of Clinical Research, University of Bern
Liechti	Fabian D.	Institute for Infectious Diseases, University of Bern
Liu	He	Pharmacology, University of Bern
Lutolf	Matthias	EPFL Lausanne
Maleh Mir	Mohsen	Hematology, University Hospital Zurich
Malonzo	Cherry	Surgical Technology and Biomechanics, University of Bern
Marcu	Irene Cristina	Department of Physiology, University of Bern
Martin	Ivan	University Hospital Basel
Mateescu	Bogdan	ETH Zurich
Mathivanan	Isai	Ophthalmology, Inselspital, Bern University Hospital
Melotti	Alice	University of Geneva
Messerli	Marianne	Department of Clinical Research, University of Bern
Metrich	Melanie	University of Lausanne Medical School
Meyer	Morten	Odense, DK
Meyer	Patrick	Witec AG
Mirsaidi	Ali	Biotechnology & Molecular Medicine, University of Zurich
Mishra	Sonakshi	CMU, University of Geneva
Mitsiadis	Thimios	Institute of Oral Biology, University of Zurich
Mühlethaler-Mottet	Annick	University Hospital CHUV
Müller	Antonia	Hematology, University Hospital Zurich
Müller	Martin	Obstetrics and Gynecology, Inselspital, Bern University Hospital
Müller	Eliane J	Molecular Dermatology, Vetsuisse, University of Bern
Nowell	Craig	SV ISREC EPFL Lausanne
Onur	Aysel	University of Fribourg
Oppliger	Byron	Prenatal Medicine, University of Bern
Pabler	Andreas	Huber & Co. AG
Pagella	Pierfrancesco	Institute of Oral Biology, University of Zurich
Palchykova	Svitlana	Neurology, Inselspital, Bern University Hospital
Papadimitropoulos	Adam	University Hospital Basel
Pelttari	Karoliina	ICFS, University Hospital Basel
Peng	Ren-Wang	University of Bern
Periasamy	Ramesh	Prenatal Medicine, University of Bern
Pippenger	Benjamin	University Hospital Basel
Plaisance	Isabelle	Experimental Cardiology, University Hospital CHUV
Porz	Nicole	Neurosurgery, Inselspital, Bern University Hospital
Radpour	Ramin	Hematology, University Hospital Zurich
Radtke	Freddy	SV ISREC EPFL Lausanne
Ramenzoni	Liza	Oral Biology, University of Zurich
Reinhart	Ursula	Laboratory for Prenatal Medicine, University of Bern
Reisenhofer	Miriam	Ophthalmology, Inselspital, Bern University Hospital
Roberti	Stefano	Ophthalmology, Inselspital, Bern University Hospital
Roccio	Marta	Inner ear research, University of Bern
Rogner	Wolfgang	Cryo-Save AG
Ronzoni	Flavio	Centre Medical Universitaire, University of Geneva
Ruppen	Janine	ARTORG Center, University of Bern
Sacchi	Veronica	Biomedicine and Surgery, Basel University Hospital
Sallin	Pauline	Zoology, University of Fribourg
Sarode	Bhushan	EPFL, Lausanne
Sayar	Beyza	Molecular Dermatology, Vetsuisse, University of Bern
Schäfer	Simon	Anatomy, University of Zurich
Scherberich	Arnaud	University Hospital Basel
Schläfli	Philipp	Swiss Paraplegic Research, Nottwil
Schoeberlein	Andreina	Laboratory for Prenatal Medicine, University of Bern
Schübeler	Dirk	FMI University of Basel
Schutzius	Gabi	Novartis Pharma AG
Schwarz	Daniel	Institute of Anatomy, University of Zurich
Seebeck	Thomas	IBZ, University of Berne
Seiler	Stefanie	Neurosurgery, Inselspital, Bern University Hospital
Seipel	Katja	Med. Oncology, Clinical Research, University of Bern
Senn	Pascal	Inner ear research laboratory, University of Bern
Sgroi	Stefania	Neurology, Inselspital, Bern University Hospital
Shakhova	Olga	Institute of Anatomy, University of Zurich
Siegl-Cachedenier	Irene	University of Geneva Medical School
Singovski	Grigori	CMU, University of Geneva
Sommer	Lukas	Institute of Anatomy, University of Zurich
Stavropoulou	Vaia	DBM, University Hospital Basel
Sterthaus	Oliver	UFK Basel
Stoyanov	Jivko	Swiss Paraplegic Research, Nottwil

Participants

Stroka	Deborah	DKF Visceral Surgery, University of Bern
Stüdle	Nicolas	Institute for Infectious Diseases, University of Bern
Surbek	Daniel	Inselspital, Bern University Hospital
Sütterlin	Rosmarie	Biozentrum, University of Basel
Takizawa	Hitoshi	Hematology, University Hospital Zurich
Tamò	Luca	Department of Clinical Research, University of Bern
Taoyuwapan	Issarawan	Biomedical Engineering, University of Bern
Thaiwichai	Suwanwadee	University of Bern
Thorimbert	Valentine	University of Fribourg
Tiaden	André, Nicki	CABMM, University of Zürich
Todesco	Liliane	Biozentrum TMCF, University of Basel
Tonnarelli	Beatrice	ICFS - University Hospital Basel
Tschudin	Denise	BD Bioscienes
Tuncer	Eylul	Institute of Anatomy, University of Zurich
Urwyler	Prabitha	Biomaterials Science Center
Vanroth	Lara	Med. Oncology, Clinical Research, University of Bern
Vernet	Rémi	CMU, University of Geneva
Weber	Fabienne	Labortierkunde, University of Zurich
Widmer	Hans Rudolf	Neurosurgery, Inselspital, Bern University Hospital
Wirth	Silvia	SV ISREC EPFL Lausanne
Wittmaack	Gertrud	Cryo-Save AG
Wodnar-Filipowicz	Aleksandra	University of Basel
Woloszyk	Anna	Institute of Oral Biology, University of Zurich
Zemke	Martina	Anatomy, University of Zurich
Zimmermann	Verena	University of Fribourg
Zingg	Daniel	Institute of Anatomy, University of Zurich
Zinkernagel	Martin	Department of Clinical Research, University of Bern
Zurkirchen	Luis	Anatomy, University of Zurich

Sponsors

This event was only possible with sponsoring by:

Thank you for supporting the 9th SSCN Meeting.

Regenerative Neuroscience

SCRM
Stem Cell Research
Regenerative Medicine
Bern

Regenerative Neuroscience Cluster

Organizers SSCN 2013
Daniel Surbek, MD
Volker Enzmann, PhD
Hans Ruedi Widmer, PhD

Inselspital, Bern University Hospital, and University of Bern
CH-3010 Bern
Administration:
Phone: +41 (0)31 632 24 22
Mail: lilith.buetler@insel.ch