



**University of
Zurich** ^{UZH}

Institute of Anatomy – Centre for Evolutionary Medicine

Centre for Evolutionary Medicine

Annual Report 2013

Prof Dr Dr med. Frank Rühli, Head

KD Dr med Thomas Böni, Co-Head

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1 Management Summary



Abigail Bouwman in the field with an ancient tooth later being sampled.

1.1 Management Summary Head of ZEM

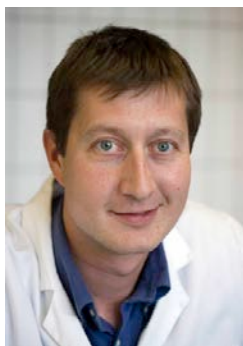
Dear friends, colleagues and supporters,

It is a real pleasure for me to present to you the ZEM annual report of the year 2013. The ZEM now runs for its third consecutive full year. As the major achievements I would like to draw the focus on the variety of scientific publications, which appeared in 2013. The publications reflect the broad range of evolutionary topics, which are covered by the members of the ZEM.

More and more we also have young students who join us for their MSc or PhD. The numbers of international collaborators are increasing too, as do the research projects. Especially in the molecular field we are getting more and more established, thanks also e.g. due to new rooms which we were able to use during this year. We now have a decent setting to analyse ancient biomolecules, a field of research, which is dramatically changing. Also, we were able to expand the imaging facilities at the ZEM during the reporting period. Exemplary, with a state-of-the-art portable x-ray unit we are now able to examine valuable historic specimens in situ in the field. To summarize, the ZEM as an academic unit was again established even more, both, locally and internationally. For example, the ZEM is also part of the University Research Priority program "Evolution in action" which started successfully in 2013. Also, we run for the first time a full teaching module (three weeks, more than 100 contact hours) in Evolutionary Medicine at the Science Faculty of the UZH.

I would like to take this opportunity to thank also to all our financial funding bodies – especially the enormously generous Mäxi Foundation which provides most critical financial support – but also all our international and local collaborators, members of the Advisory Board and of the Honorary Committee. But foremost I would like to thank all my employees who do a fantastic job! It is for me personally a real privilege to be able to work in such a stimulating research environment. If you as a reader have any comments or further specific interest please let us know anytime!

Sincerely,



Frank Rühli, Head ZEM

Zurich, 19th of April, 2014

1.2 Address by the Head of the Institute of Anatomy

Modern Anatomy of today is no longer limited by methodological borders and is no longer confined into the classical research areas. Modern Anatomy is free to ask entirely new questions and to understand the human body from entirely new aspects. Modern Anatomy makes use of state of the art cellular, molecular and functional investigations, but maintains and develops its strong morphological competence. Today we are in an enormous privileged situation. We cannot only rely on the overall and easily available results of centuries of research, but also we can use modern sophisticated experimental methods, innovative concepts and entirely new technologies. Today we can ask almost every question. The possibility of bringing new ideas into reality is higher than ever before.

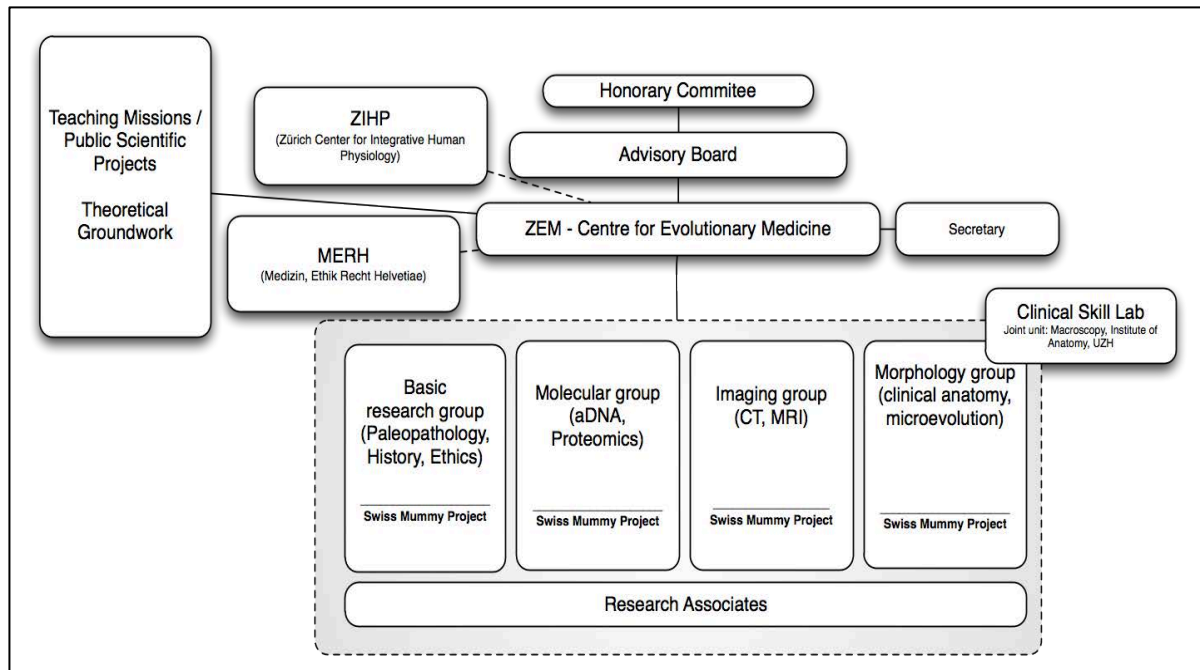
During the last year, the ZEM was very successful. A lot of scientific publications reflecting the broad scientific approach have appeared. Examples are the frequency of European lactase persistence allele in medieval Central Europe, modern imaging studies in ancient Peruvian and Egyptian mummified tissues, the changing body shape of Swiss conscripts since the late 19th century, and the investigation of the remains of Charlemagne and of the Iceman. ZEM scientists are enormously active in international collaborations, conferences and field studies. Beyond the already established fields of research, ZEM scientists started to unlock the molecular potential of preserved human soft tissues and the hidden secrets of past human infections by the characterization of microorganisms that can be isolated from ancient remains. In various fields, ZEM research is at the forefront of new ideas, methods and developments.

Our colleagues from the Center of Evolutionary Medicine developed their research fields with passion and with dedication, asked questions, which are important for our society. I wish to congratulate my colleagues from the ZEM for their pioneering and important work!



Prof Dr Dr Oliver Ullrich (Director, Institute of Anatomy, University of Zurich)
Zurich, 18th of April, 2014

2 The Centre for Evolutionary Medicine



Organisational setting of the ZEM.

Aim

The “**Zentrum für Evolutionäre Medizin**” (ZEM; **Centre for Evolutionary Medicine**) is a research unit of the Institute of Anatomy, Medical Faculty, University of Zurich. As an academic medical project, the ZEM is one of a kind worldwide. As a transdisciplinary bridge between the past, the present and the future, researchers at the ZEM will study the evolutionary aspects e.g. of disease aetiology (contributing factors such as lifestyle or infectious environmental factors) and disease patterns (prevalence, socio-economic stratifications etc.) in general. Primarily musculoskeletal and joint diseases as well as the molecular evolution of pathogens disease will be studied. Some general research questions:

- How does clinical medicine benefit specifically from evolutionary perspectives of disease?
- How do evolutionary vulnerabilities of human anatomy / physiology contribute to disease?
- How do ancient samples such as skeletons and mummies act as major source for the study of the evolution of disease, e.g. pathogen pandemics?

Evolutionary Medicine represents best interdisciplinary science, which thus has significance, e.g. for specialized clinicians and general practitioners. At the ZEM, researchers from fields as varied as anthropology, paleopathology, ancient DNA and proteomics research, veterinary sciences, human morphology and imaging shall work together. As one of the centre’s main interests is historical human remains and/or mummified tissue, the ZEM also favours a continuous reflection about ethical standards relative to highly invasive procedures and the ethical dilemmas that arise from dealing with historical remains. The centre **includes four main research units: a “biomolecular”, an “imaging”, a “morphology ” and a “basic research”** group. A “**Clinical Skill Lab**” for transitional clinical research is also attached to the Centre, as are multiple local and international collaborations. The **Swiss Mummy Project** (focusing on the scientific examinations of ancient human mummies) is an on-going, earlier established, UZH research project, which forms now part of all research groups within the ZEM.

Honorary Committee

Dr M. Dell Ambroggio, Secretary of State for Education and Research, Federal Swiss Government

M. Coninx, Managing Director of “Finanz und Wirtschaft” Tamedia AG

Prof F. Gutzwiller, Member of Swiss Senate for the canton Zürich

Dr T. Heiniger, Member of the governing council of the canton Zürich

M. Prenosil, CEO, Sprüngli AG, President of the City Association Zürich

Dr T. Wellauer, COO, Swiss Re, Zürich

Prof D. Wyler, Vice President Medicine and Natural Sciences of the University of Zürich

Advisory Board

Prof M. Gassmann, Director Institut for Veterinary Physiology, Center for Integrative Human Physiology, UZH

Prof S. Gay, Rheumatology, Institute for Physical Medicine, UZH

Prof Ch. Gerber, Chief Doctor Orthopedics Clinic Balgrist, UZH

Prof K. Grätz, Dean Medical Faculty, UZH

Prof M. Hengartner, Dean Mathematics and Natural Sciences Faculty, UZH

Prof M. Rudin, Institute for Biomedical Engineering, ETH

Prof B. Tag, Institute of Law, UZH, Chairwoman Centre of Competence Medicine – Ethics – Law Helvetiae

Prof M. Thali, Director Institute for Forensic Medicine, UZH

Prof O. Ullrich, Director Institute of Anatomy, UZH

Prof C. van Schaik, Director Institute for Anthropology, UZH

Prof B. von Rechenberg, Director Center for Applied Biotechnology & Molecular Medicine UZH, Vetsuisse



ZEM Honorary Committee members during a meeting at the ZEM in August 2013.

International Collaborators

Prof B. Blümich, Rheinisch-Westfälische Technische Hochschule, Aachen

Prof M. Bock, Radiologisches Department, Universitätsklinik, Freiburg im Breisgau

Prof B. Bogin, Loughborough University, Loughborough, Leicestershire

Dr E. Cappellini, Centre for GeoGenetics, Natural History Museum & University of Copenhagen

Prof T. Gilbert, Centre for GeoGenetics, Natural History Museum & University of Copenhagen

Prof M. Henneberg, Anatomical Sciences, University of Adelaide

Prof I. HersHKovitz, Anatomy and Anthropology, Faculty of Medicine, Tel Aviv University

Prof S. Ikram, Department of Egyptology, American University Cairo

Prof R. Jankauskas, Department of Anatomy, Histology and Anthropology, Faculty of Medicine, Vilnius University

Prof em. J. Komlos, Volkswirtschaftliches Institut, LMU München

Dr D. Piombino-Mascali, Department of Cultural Heritage and Sicilian Identity, Palermo

Dr Ch. Scheffler, Institut für Biochemie und Biologie, Universität Potsdam

Prof W. Schiefenhövel, Human Ethology Group, Max-Planck-Institute, Andechs

Prof B. Solomon, Department of Orthopaedics, Royal Adelaide Hospital

Prof N. Tuross, Department of Human Evolutionary Biology, Harvard University

Prof J. Tutkuviene, Department of Anatomy, Histology and Anthropology, Faculty of Medicine, Vilnius University

PD A. Zink, Institute for Mummies and the Iceman, EURAC, Bolzano

Prof Dong Hoon Shin, Department of Anatomy / Institute of Forensic Medicine, National University College of Medicine, Seoul

Amàlia Valls Martínez, Head of Paleopathology and Anthropology Dept. at Instituto de Estudios Científicos en Momias (IECIM), Madrid

Mercedes González Fernández, Director at Instituto de Estudios Científicos en Momias (IECIM), Madrid

Prof A. Nebel, Institute for Clinical Molecular Biology, Christian Albrecht-University, Kiel

Prof Maria Teschler-Nicola, Dept. of Anthropology, MNH, Vienna

Local Collaborators

Prof J. Hodler, Institut für Diagnostische Radiologie, USZ

Prof Ch. Pfirrmann, Radiologie, Uniklinik Balgrist, UZH

PD D. Schaer, Klinik und Poliklinik für Innere Medizin, USZ

Prof R. Schlapbach, Functional Genomics Center, UZH, ETH Zurich

Divisionär A. Stettbacher, Oberfeldarzt, Schweizer Armee, Bern

Prof G. Székeley, Institut für Bildverarbeitung, ETH Zurich

Prof U. Woitek, Institut für Empirische Wirtschaftsforschung, UZH



Members and affiliates of the ZEM (and an anonymous snowman...) at the "Snow Day" in Fideris/Heuberge in January 2013.

3 The Research Groups



The Scanliner at Irchel Campus during the 3D Full Body Scan pilot study conducted in February 2013.

3.1 The Molecular Group

Dr Abigail Bouwman (Head a.i.)

Dr Michael Campana

Gülfirde Akgül, MSc, technician

Claudia Vigano, MSc, PhD student

Giada Ferrari, MSc, PhD student

Annina Krüttli, BA student

Molebogeng Bodiba, MSc-student (University of Pretoria)



Giada Ferrari, PhD Student, taking human tissue samples from the collection "Narrenturm" in Vienna.

- Ancient DNA investigation of the European origin of the CCR5-d32 HIV-resistance allele
 Problem: How long has a HIV resistance allele existed in historical human populations
 Goal: qPCR allele typing of medieval European populations
- Ancient DNA and paleoprotein investigation of dairying and the evolution of Swiss diet
 Problem: Lactose tolerance and its evolution relative to dairying is not well known
 Goal: SNP typing of the European lactase persistence allele; biomolecular analysis of dietary remnants recovered from ancient teeth
- Dental Calculus Project
 Problem: Dental calculus contains a diverse range of bacterial and dietary remnants, but it is unknown if DNA or proteins preserve within the mineralized biofilm
 Goal: Determine if dental calculus is a reliable reservoir of biomolecular information about past health, disease, and diet

- Health and Diet in Andean Mummies
Problem: Few data are available for the dietary, health and sourcing of Pre-Columbian Andean mummies preserved in worldwide museum collections.
Goal: We will obtain stable isotope data (carbon, nitrogen, hydrogen and oxygen) as well as radiocarbon dates to reconstruct Andean diet in time and space.
- Using high-throughput sequencing to investigate the cause of a colonial native Mexican (Mixtec) epidemic
Problem: The molecular cause of many historic epidemics is unknown
Goal: Determine the cause of these specific epidemics by using state-of-the-art genomic methods
- Ancient DNA analysis in the Thulamela remains: Deciphering the migratory pattern of a southern African human population
Problem: Migratory patterns of Iron Age populations is evidenced in the overlapping of cultural practices and lingual similarities, these provide clues to genetic relatedness, however this needs to be clarified
Goal: To determine the genetic proximity of different southern African groups using ancestry specific DNA markers in comparing living people to those of Iron Age individuals
- Evolution of Malaria and G6PD Deficiency in Europe
Problem: The evolution of malaria related to the evolution of G6PD deficiency is not well known.
Goal: To analyze samples from three different European countries (Switzerland, Sardinia and Corsica) with differing histories of malaria and G6PD frequencies.
- Virulence evolution in past human pathogens
Problem: archival soft tissue samples are a poorly exploited, disease-specific pathological archive for retrospective molecular investigations
Goal: characterizing historic mutations and recombination events in pathogenic viruses and bacteria using high-throughput sequencing approaches on archival soft tissue samples
- Canopic Jar project: Recovering genetic data from ancient Egyptian preserved tissues.
Problem: Can ancient DNA be recovered from less culturally sensitive materials in order to determine kinship patterns and gain a greater insight to the health of ancient Egypt?
Goal: Genetic typing of human and bacterial DNA from canopic jars (and associated canopic samples)
- Interpreting the multiple burials from medieval Geneva
Problem: Within a large burial ground four graves containing multiple individuals were discovered dating to a period of no known epidemics.
Goal: To establish if the individuals buried together were related, and what, if any, pathogens were present in caused them to die at the same time.

3.2 The Imaging Group

Dr Dr Roger Seiler (Head a.i.)

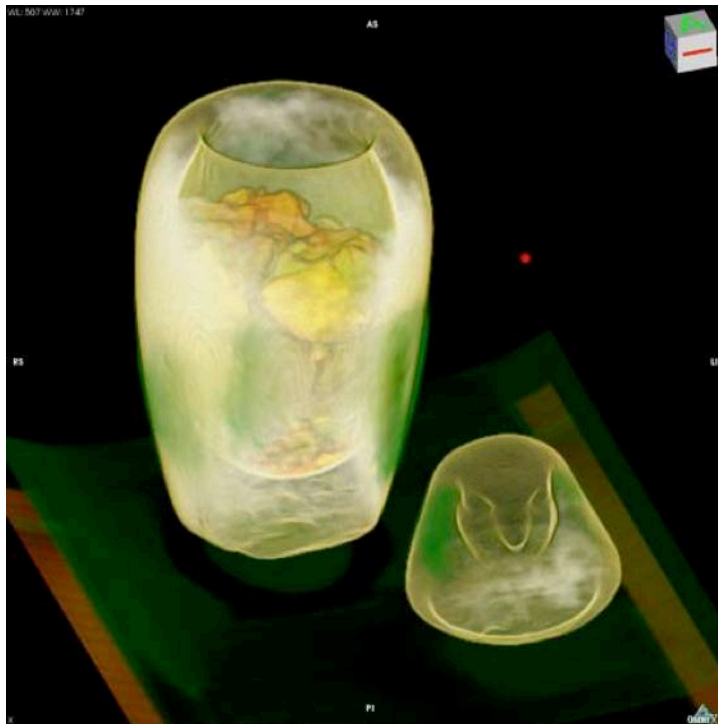
Dr Lena Öhrström

Johann Wanek, MSc Med Phys, PhD student

Marc Kaufmann, MD thesis student

Katja Dageförde, external MD thesis student (University of Münster)

Christina Sydler, MD thesis student



CT-based 3D reconstruction of an ancient Egyptian canopic jar with tissue filling

- Swiss Mummy Project: Various radiological case studies of single mummies (e.g. Iran, Botswana, Switzerland)
 Problem: Unknown pathologies, cause of death etc. in unique single mummies
 Goal: To determine radiologically pathological diagnosis etc. in these individuals
- Dental pathologies of the Neolithic Iceman "Ötzi"
 Problem: Did the Neolithic Iceman have Caries and Periodontitis?
 Goal: Re-evaluation of CT-Scans to prove the dental pathologies
- Radiation efficiency of randomized distributed cell nuclei in different phantom tissues
 Problem: Impact of radiation on mummified tissues is unknown
 Goal: Comparison between simulated cell damage (Monte Carlo simulation) and real irradiation experiments

- Diagnostic Application of terahertz imaging on ancient mummified tissues
Problem: Very limited experience on applying terahertz-based imaging on ancient tissues
Goal: To evaluate and improve THz imaging systems specifically for mummy investigation
- MR imaging of ancient mummified tissues
Problem: MR Imaging in mummified tissue is challenging tissue due to short relaxation times
Goal: Further development of UTE/ZTE (ultra-short-echo-time/zero-echo-time) sequences specifically for mummified samples
- Dental investigations on the mummies from the Capuchin Catacombs of Palermo, Italy (18th-19th centuries AD)
Problem: No information available about oral pathologies of friars and laymen from Palermo
Goal: To analyse dental health of this population

3.3 The Morphology Group

Dr Martin Häusler (Head)

Dr Dr Karl Link

Dr Kaspar Staub

Dr Radoslav Panczak

Dr Hila May

Sabrina Meyer, MSc, PhD student

Sandra Mathews, MSc, PhD student

Nakita Frater, MSc, PhD student

Cecilia Collins, external PhD student (Reading University UK)

Katja Dageförde, external MD thesis student (University of Münster)

Kara Holloway, external PhD student (University of Adelaide)

Aaron Hermann, external PhD student (University of Adelaide)

Sarah Robertson, external PhD student (Australian National University Canberra)

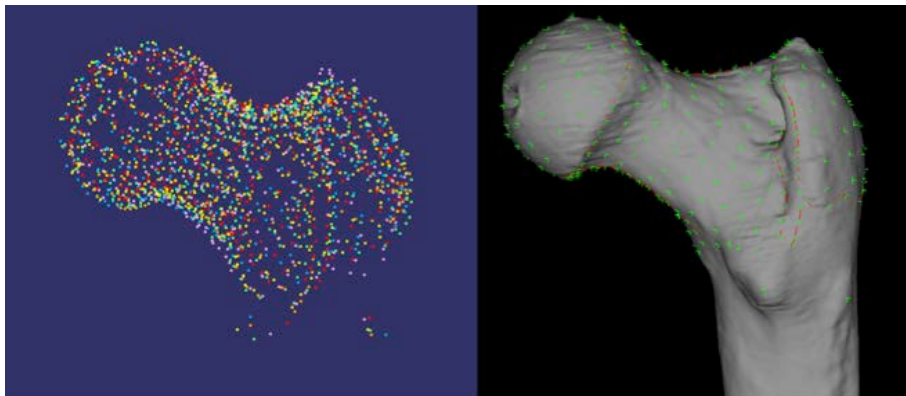
Sabine Landis, MSc student, Zurich

Nicole Hofmann, MMed student, Zurich

Claudio Bigger, MMed student, Zurich

Michael Strässle, MMed student, Zurich

Almudena Deveso Peiro, MSc student (University of Valencia; Oct-Dec 2013)



Surface reconstruction of a proximal femur including landmarks, curve semi-landmarks and surface semi-landmarks (right image) and the Procrustes analysis of several samples (left image).

- Galler pathological bone reference series database
 Problem: Historical pathology bone reference series are rare, but a very available source for a medicine.
 Goal: To complete an online database for possible further use e.g. for teaching
- Swiss Biological Standard of Living - study of Swiss Armed Forces conscripts 1875-2014
 Problem: Impact of body shape, socio-economic factors or deficiencies is not well known
 Goal: To analyse etiologically secular trends of BMI, stature and body shape

- Socioeconomic, temporal and regional variation in Body Mass Index among Swiss conscripts 2004-2013
Problem: Representative measured and nation-wide height and weight data is rare
Goal: Introduce anthropometric data from Swiss Conscript to overweight and obesity monitoring systems in Switzerland
- Secular trend, regional and socio-economic differences in height, BMI and body shape in German conscripts 1956-2010
Problem: Short termed alteration of body measures in young Germans are hardly known
Goal: To describe influencing factors of body shape in the selected samples
- Evolution of bipedal locomotion - in particular its relationship to functional morphology and pathologies
Problem: Medical disorders related to bipedal posture are hitherto only partially investigated
Goal: To investigate morphological factors related to bipedalism and pathologies
- Evolutionary background of pathologies of the human shoulder girdle, knee and spine
Problem: The major human evolution compromised to an unknown degree to the morphology
Goal: To analyze the degree of adaptation of major human joints to contemporary lifestyle
- Shape analyses of the human proximal femur
Problem: Femur morphology contains significant information on past and present human habitual activities, sex and age. Yet, past methodologies were lack in the description of the 3-dimensional shape of the femur.
Goal: Using computerized geometric-morphology method, we aim to identify differences in femoral shape between the sexes, age groups and individuals with different occupation and physical activity. Furthermore, the ability to quantify the proximal femoral 3-Dimensional shape may have important clinical implications (designing prostheses for femoral neck fracture, etc.).

3.4 The Basic Research Group: Paleopathology, History and Ethics

KD Dr Thomas Böni (head), co-head ZEM and research associate

Michael Habicht, MA

Dr Dr Roger Seiler

Dr Urs Leo Gantenbein, research associate

Dr Philipp Gruber, research associate

Dr Ina Kaufmann, research associate

- Clinical Paleopathology Group

Problem: In Switzerland there is lack of medical interpretation of paleopathological finds

Goal: To provide basic medical consultancy to anthropologists and archaeologist in interpreting historic human pathological remains

- Historic aspects of mummy research

Problem: There is a lack of research on various historic aspects of mummy research

Goal: To investigate various aspects of mummy research with a particular focus, such as on Paracelsus work, Kirchers work, Mumia vera aegyptiaca etc.

- Canopic Jar Project

Problem: Ancient Egyptian Jars with their content of mummified intestines have hardly ever been examined, particular on a molecular level

Goal: To investigate by Egyptological, radiological and molecular techniques various canopic jars from European collection to investigate kinship and possible pathologies

- Ethics and Research with human remains

Problem: A clear “code of ethics” for ancient mummy research is lacking

Goal: To update the ZEM code of ethics / ethical framework

3.5 Administration and Support

Administrative support: *Lena Öhrström and Irina Rau*

Finance controlling: *Marc Steinmann*

National and international research associates:

Dr Maria Ines Hofmann, Chile

Dr Arthur Saniotis, Australia

Dr Christina Warinner, USA

Dr Ina Kaufmann, Switzerland

Natalia Shved, Switzerland

Olia Bolshakova, Switzerland

Dr Kara Holloway, Australia

General ZEM support by Institute of Anatomy UZH:

HR-secretary: Marianne Ott

Photographer: Heinz Sonderegger

Histology technician: Charlotte Burger

IT-responsible: Savino Jossi

Note: Some of the listed people have not been at the ZEM for the whole year or in a full time appointment.

4 The Facilities



One of the new ZEM aDNA rooms (post-PCR-lab)

4.1 The offices

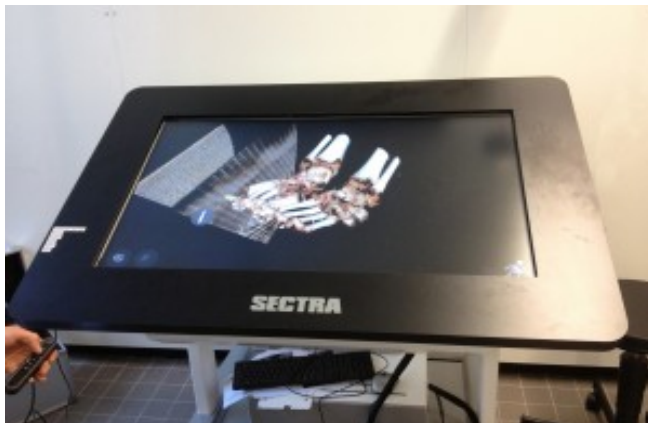
The ZEM has several regular offices to be used by the multiple research groups, as well as a meeting room and a break room. All ZEM PhD students are housed in one dedicated office room independent of their background to allow scientific exchange between the multiple groups.

4.2 The ancient DNA labs

The ZEM was lucky to receive more laboratory space for the ancient DNA group. Two rooms allow a state-of-the-art workflow. It allows a faster analysis process and an improved spatial separation of the various delicate steps. These rooms are on top of the already existing clean Lab, which is a well-established state-of-the-art laboratory for the extraction and analysis of ancient DNA from historical samples such as bone, mummified tissue or coprolites.

4.3 Imaging Facilities

During 2013 the ZEM was able to acquire new imaging equipment. Some of them have in the meantime already been used in the field and at the Irchel Campus. Among others, the ZEM's imaging facilities comprise now a new mobile X-ray unit, a 3D Scanner and a visualisation table. The ZEM also has an ultrasound bone densitometer. Finally, the ZEM is a co-owner of a Micro-CT unit located at the University Hospital Zurich (operated by at the Institute of Diagnostic and Interventional Radiology, funded by the Swiss National Science Foundation).



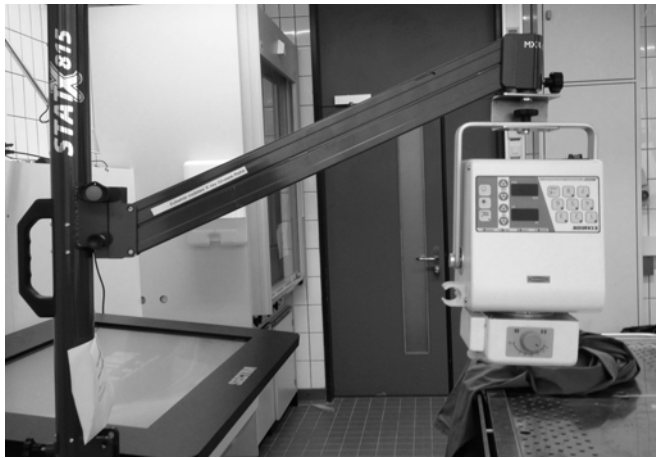
The visualisation table allowing state-of-the-art demonstration and analyses of images for science and teaching.

4.4 The Dry Specimen Storage Room

The ZEM houses a couple of important research collections (bone samples, mummies, histological slides etc.). During the year multiple human tissue samples as part of the on-going research projects have been received. The storage room is now quite full and more, better-equipped storage space would be most desirable.

4.5 The Clinical Anatomy Skills Lab

The Clinical Anatomy Skills Lab is a joint facility of the Division of Gross Anatomy and the Centre for Evolutionary Medicine. The Skills Lab's main goal is to offer an environment where clinicians can access the Institute's body donations in a controlled environment and where they can establish and train new surgery protocols, attend postgraduate education in clinical anatomy or perform research. The ZEM regularly uses the Clinical Anatomy Skills Lab to host local and international visitors who are interested in working on modern and ancient human corpses for scientific purposes. In 2013, new infrastructure such as fully ventilated dissection tables have been integrated in the Clinical Skills Lab.



The portable x-ray unit stored in the Clinical Anatomy Skills Lab.

4.6 The Dry and Wet Lab

These rooms are fully operational. They serve as the main areas to cut, dissect and further analyse dry and wet tissue samples, respectively. In 2013 especially the dry lab has been used constantly for analyses e.g. of historic skeletal series.

5 Past dates with ZEM participation



Michael Campana, Abigail Bowman, Frank Rühli, and Lena Öhrström at the 8th World Congress on Mummy Studies in Rio de Janeiro, Brazil.

Members of the ZEM presented their scientific work at various conferences in 2013, among others the following:

31 Jan - 2 Feb: Conference on the Bioarcheology of Ancient Egypt, Cairo, Egypt (Frank Rühli)

2 - 3 Apr: 22nd Annual Meeting Paleanthropology Society, Honolulu, USA (Sabrina Meyer, Sandra Mathews)

9 - 10 Apr: 40th Annual Meeting of the Paleopathology Association PPA, Knoxville, USA (Frank Rühli)

9 - 13 Apr: 82nd American Association of Physical Anthropologists Annual Meeting AAPA, Knoxville, USA (Frank Rühli, Martin Häusler, Sabrina Meyer, Sandra Mathews)

22 - 24 Apr: American Association of Anatomy Meeting, Boston, USA (Frank Rühli)

12 - 15 May: European Congress on Obesity (ECO), Liverpool, UK (Kaspar Staub)

6 - 9 Aug: 8th World Congress on Mummy Studies, Rio de Janeiro, Brasil (Frank Rühli, Roger Seiler, Lena Öhrström, Abigail Bowman, Michael Campana)

2 - 6 Sept: German Society of Anthropology (GfA) 10th international meeting, Bozen, Italy (Frank Rühli)

2 Sept: CIMST Summer school, ETHZ (Frank Rühli, Lena Öhrström)

6 Sept: 75th Annual Meeting of Swiss Society for Anatomy, Histology and Embryology (SSAHE), Fribourg, Switzerland (Frank Rühli, Karl Link)

20 - 21 Sept: 3rd Annual Meeting European Society for Human Evolution, Vienna, Austria (Martin Häusler, Sandra Mathews, Nakita Frater, Sabine Landis)

6 Missions and Affiliations



Next to one of the ZEM collaboration mission sites: Saqqara Pyramids, Egypt (February 2013)

Major missions members of the ZEM are incorporated with:

Chehrabad Saltmummy and Saltmine Exploration Project (Iran) (Prof Frank Rühli and other members of the ZEM):

The multidisciplinary analyses of an ancient Salt mine is a collaboration of the Deutsches Bergbaumuseum (Prof Th. Stöllner), the Institute of Archaeological Studies in Bochum, the Universities of Oxford and York (UK), the Cultural Heritage, Tourism and Handcraft Organisation of Zanjan, Iran (www.saltmen-iran.com).

The Leiden Excavations in the New Kingdom necropolis at Saqqara (Egypt) (Prof Frank Rühli):

This is a joint excavation, documentation and preservation project of monuments in a cemetery area of important New Kingdom officials under the lead of Rijksmuseum van Oudheden at Leiden (NL) as well as the Department of Egyptology of the Leiden University (Dr M. Raven) (www.saqqara.nl).

University of Basel Kings' Valley project (Prof Frank Rühli):

This is an excavation project lead by the Egptological Seminar (Prof S. Bickel) of the University of Basel. The main goal is the exploration of undecorated tombs next to the one of Thutmosis III (KV 34). (<https://aegyptologie.unibas.ch/forschung/projekte/university-of-basel-kings-valley-project/>)

Prof Frank Rühli is part of these missions as an expert for the investigations of the human remains.

Unfortunately, in some missions political uncertainties affected the planned progress of these missions in 2013.

Members of the ZEM are also affiliated to these institutions:

Zentrum für Integrative Humanphysiologie, UZH (Prof Frank Rühli)

Kompetenzzentrum Mediävistik UZH (Prof Frank Rühli, KD Thomas Böni, Dr Urs Leo Gantenbein, Dr Roger Seiler)

Kompetenzzentrum Medizin, Ethik Recht Helvetiae, UZH (Prof Frank Rühli)

Indian Institute of Morphology, Calcutta (Prof Frank Rühli)

Department for Human Evolutionary Biology, Harvard University (Prof Frank Rühli)

Institute of History, University of Bern (Dr Kaspar Staub)

7 Publications

Rühli and Henneberg *BMC Medicine* 2013, **11**:115
<http://www.biomedcentral.com/1741-7015/11/115>



REVIEW **Open Access**

**New perspectives on evolutionary medicine:
the relevance of microevolution for human
health and disease**

Frank Jakobus Rühli^{1*} and Maciej Henneberg²

One of the ZEM publications in 2013.

7.1 Scientific publications (peer-reviewed original articles and reviews)

Bouwman A, Rühli F

Advances in ancient DNA research can help radiological interpretations of archaeological diseases
Skeletal Radiology 2013, 42: 751-752

Haas C, Shved N, Papageorgopoulou C, Krawczak M, Purps J, Willuweit S, Roewer L

Y-chromosomal analysis of skeletal remains of Swiss national hero Jörg Njens (1596-1639)
Forensic Science International Genetics 2013, 7(6): 610-617

Habicht M, Bouwman A, Rühli F

Die Bedeutung von Kanopen als Quelle medizinischer und ägyptologischer Informationen
Goettinger Miszellen 2013, 237: 25-40

Häusler M, Schiess R, Boeni T

Evidence for juvenile disc herniation in a *Homo erectus* boy skeleton
Spine 2013, 38: 123-128

Henneberg M, Saniotis A

Conceptual challenges to evolutionary biology: A necessary step
Biocosmology-neo-Aristotelism 2013, 3(1): 7-16

Henneberg M, Saniotis A, Kumaratilake J

Creative and reasoning skills are low among health sciences students who rely mostly on memorized templates: An Australian case
Medical Science Educator 2013, 23 (1): 35-46

Henneberg M, Saniotis A

The future mismatch between biological and social development of youths
International Journal of Education and Research 2013, 19: 2

Hermann A, Henneberg M

The Doping Myth: 100 m sprint results are not improved by 'doping'
International Journal of Drug Policy 2013, 24(2): 110-114

Holloway K, Link K, Rühli F, Henneberg M

Skeletal lesions in human tuberculosis may sometimes heal: an aid to palaeopathological diagnoses
PLoS ONE 2013, 8(4): e62798

Holloway K, Staub K, Rühli F, Henneberg M

Lessons from history of socioeconomic improvements: A new approach to treating multi-drug-resistant tuberculosis
Journal of Biosocial Science 2013, Oct 8: 1-21

Holloway K, Henneberg RJ, De Barros Lopes M, Staub K, Link K, Rühli F, Henneberg M

Secular Trends in Tuberculosis during the Second Epidemiological Transition: A Swiss Perspective
Advances in Anthropology 2013, 3(2): 78-90

Kirchengast S, Rühli F

Evolutionary medicine and its implications for endocrinological issues (e.g. menopause)
General and Comparative Endocrinology 2013, 52(3): 145-149

Link K, Allio I, Rand J, Eppler E

The effect of experimentally induced chronic hyperglycaemia on serum and pancreatic insulin, pancreatic islet IGF-I and plasma and urinary ketones in the domestic cat (*Felis felis*)
General and Comparative Endocrinology 2013, 188: 269-281

Meyer S, Reichlin Th, Rühli F, Häusler M

Drei Skelettfunde aus Harmettlen, Goldau (Kanton Schwyz): die ersten untersuchten Opfer des Bergsturzes von 1806
Bulletin der Schweizerischen Gesellschaft für Anthropologie 2013, 8(9): e75863

Öhrström L, Von Waldburg H, Speier P, Bock M, Rühli F

Scenes from the past: MR imaging versus CT of ancient Peruvian and Egyptian mummified tissues

Radiographics 2013, 33 (1): 291-296

Panzer S, Borumandi F, Wanek J, Papageorgopolou C, Shved N, Colacicco G, Rühli F

"Modeling ancient Egyptian embalming": radiological assessment of experimentally mummified human tissue by CT and MRI

Skeletal Radiology 2013, 42 (11): 1527-1535

Saniotis A, Henneberg M

Evolutionary Medicine and Future of Humanity: Will Evolution Have the Final Word?

Humanities 2013, 2: 278-291

Schär DJ, Bühler PW

Cell-Free Hemoglobin and its Scavenger Proteins: New Disease Models leading the Way to targeted therapies

Cold Spring Harb Perspect Med 2013, 3(6): pii: a013433

Schaer CA, Deuel JW, Bittermann AG, Rubio IG, Schoedon G, Spahn DR, Wepf RA, Vallelian F, Schaer DJ

Mechanisms of haptoglobin protection against hemoglobin peroxidation triggered endothelial damage

Cell Death Differ 2013, Nov 20(11): 1569-79

Schiess R, Häusler M

No skeletal dysplasia in the Nariokotome boy KNM-WT 15000 (*Homo erectus*): a reassessment of congenital pathologies of the vertebral column

American Journal of Physical Anthropology 2013, 150(3): 365-374

Rühli F, Henneberg M

New perspectives on evolutionary medicine: the relevance of microevolution for human health and disease

BMC Medicine 2013, 11(1): 115

Seiler R, Spielmann A, Zink A, Rühli F

The oral pathologies of the Neolithic Iceman, ca. 3300 BC

European Journal of Oral Sciences 2013, 121 (3pt1): 137-141

Staub K, Woitek U, Rühli F

Grenzüberschreitende Zusammenarbeit mit anthropometrischen und medizinischen Daten der Rekrutierung

Swiss Review of Military and Disaster Medicine 2013, 1: 41-44

Staub K, Woitek U, Pfister C, Rühli F

Überblick über zehn Jahre historisch-anthropometrische Forschung in der Schweiz: Säkularer Trend, soziale und regionale Unterschiede in der mittleren Körperhöhe und -form seit Beginn des 19. Jahrhunderts

Bulletin Schweizerischen Gesellschaft für Anthropologie 2012/2013, 18 82): 37-50

Staub K, Rühli F

From growth in height to growth in breadth: The changing body shape of Swiss conscripts since the late 19th century and possible endocrine explanations

General and Comparative Endocrinology 2013, 188: 9-15

Wanek J, Speller R, Rühli F

Short note on our research in cancer: Cell and DNA damage from the point of view of a medical physicist

Journal of Molecular and Genetic Medicine 2013, 7(4)

Wanek J, Speller R, Rühli F

Direct action of radiation on mummified cells: modeling of computed tomography by Monte Carlo algorithms

Radiation and Environmental Biophysics 2013, 52 (3): 397-410

7.2 Published Abstracts and Presentations

Published abstracts (in peer-reviewed journal, published conference proceedings)

Bowman A, Rühli F.

Ancient DNA techniques and their applications to Mummy studies

Book of abstracts, Rodrigues-Carvalho (ed.), Rio de Janeiro: Museu Nacional, 2013; 8th World Congress on Mummy Studies, Brazil, p. 46
ISBN 978-85-7427-048-7

Bowman A, Kennedy S, Mueller R, Roberts C, Brown T.

Ancient tuberculosis DNA revealed by Next Generation Sequencing

American Journal of Physical Anthropology, Annual meeting Issue 2013 (Suppl 56), p. 174
ISSN 0002-9483

Bowman A, Warinner C, Shved N, Akgül G, Trancik V, Rühli F.

Historic CCR5Δ32 frequency in Central Europe

Supplement to the Paleopathology Newsletter, 40th Annual Meeting of Paleopathology Association, Knoxville, Tennessee, 9-10 April 2013,
ISSN: 01484737

Campana M, Tuross N, Rühli F.

Detection and identification of the microbiome in archaeological soft and hard tissues: a high-throughput DNA sequencing approach

Book of abstracts, Rodrigues-Carvalho (ed.), Rio de Janeiro: Museu Nacional, 2013; 8th World Congress on Mummy Studies, Brazil, p. 47
ISBN 978-85-7427-048-7

Habicht M, Bouwman A, Rühli F,

The Canopic Jar Project. Mummified human tissue from Egyptian Canopic Jars as source for new information

Book of abstracts, Rodrigues-Carvalho (ed.), Rio de Janeiro: Museu Nacional, 2013; 8th World Congress on Mummy Studies, Brazil, p. 100-101
ISBN 978-85-7427-048-7

Häusler M, Reichlin T, Rühli F, Meyer S

The first three victims beheaded from the 1806 landslide disaster at Goldau, Switzerland

Supplement to the Paleopathology Newsletter, 40th Annual Meeting of Paleopathology Association, Knoxville, Tennessee, 9-10 April 2013,
ISSN: 01484737

Krüttli A, Warriner C, Bowman A, Della Casa Philippe, Rühli F.

Investigating Lactase persistence in a Medieval German cemetery: A step towards understanding the rise of the European lactase persistence polymorphism (-3910C/T)

American Journal of Physical Anthropology, Annual meeting Issue 2013 (Suppl 56), p. 174
ISSN 0002-9483

Kreissl Lonfat B, Kaufman I, Rühli F.

A code of ethics for research with ancient human remains

Book of abstracts, Rodrigues-Carvalho (ed.), Rio de Janeiro: Museu Nacional, 2013; 8th World Congress on Mummy Studies, Brazil, p. 54-55
ISBN 978-85-7427-048-7

Lehmann A, Woitek U, Rühli F, Staub K

“From growth in height to growth in breadth”: The change of body dimensions in Swiss and Germany conscripts since 1950 and its impact for epidemiological obesity research

Obes Facts 2013, 6 (Suppl 1): 204

Link K, Papageorgopoulou C, Gutteck U, Müller D, Rühli F, Van Hove M-L, Bianucci R

Investigations of mediaeval mummified brains found in Belgium using chemical, radiological and histological techniques

Book of abstracts, Rodrigues-Carvalho (ed.), Rio de Janeiro: Museu Nacional, 2013; 8th World Congress on Mummy Studies, Brazil, p. 94
ISBN 978-85-7427-048-7

Mathews S, Häusler M, Schmid P.

The primate upper arm: A study on the deltoid index

American Journal of Physical Anthropology, Annual meeting Issue 2013 (Suppl 56), p. 192
ISSN 0002-9483

Meyer S, Bosschetti A, Hauri R, Häusler M

A trepanned skull from the modern age (19th century) found in Steinhausen, Canton of Zug, Switzerland

Supplement to the Paleopathology Newsletter, 40th Annual Meeting of Paleopathology Association, Knoxville, Tennessee, 9-10 April 2013, ISSN: 01484737

Öhström L, Seiler R, Rühli F.

Cranial pathologies in ancient Egyptian mummies

Book of abstracts, Rodrigues-Carvalho (ed.), Rio de Janeiro: Museu Nacional, 2013; 8th World Congress on Mummy Studies, Brazil, p. 32
ISBN 978-85-7427-048-7

Öhström L, Fischer B, Bitzer A, Wallauer J, Walther M, Rühli F.

Terahertz imaging of mummified tissues

Book of abstracts, Rodrigues-Carvalho (ed.), Rio de Janeiro: Museu Nacional, 2013; 8th World Congress on Mummy Studies, Brazil, p. 35
ISBN 978-85-7427-048-7

Rühli F, Böni T.

The Legacy of bone pathology reference series: Don Ortner and the Galler Collection

Supplement to the Paleopathology Newsletter, 40th Annual Meeting of Paleopathology Association, Knoxville, Tennessee, 9-10 April 2013, ISSN: 01484737

Rühli F, Abar A, Ali A, Pollard M, Boenke N, Stöllner T.

Iranian salt mummies (2,500-1,500 BP): further multidisciplinary insights from a unique human sample

Book of abstracts, Rodrigues-Carvalho (ed.), Rio de Janeiro: Museu Nacional, 2013; 8th World Congress on Mummy Studies, Brazil, p. 61
ISBN 978-85-7427-048-7

Rühli F.

CT and MR Imaging of ancient mummified tissue: state –of-the-art

Book of abstracts, Rodrigues-Carvalho (ed.), Rio de Janeiro: Museu Nacional, 2013; 8th World Congress on Mummy Studies, Brazil, p. 35
ISBN 978-85-7427-048-7

Rühli F, Ikram S, Bickel S.

New Ancient Egyptian human mummies from the Valley of the Kings, Luxor: anthropological, radiological and egyptological investigations

Book of abstracts, Rodrigues-Carvalho (ed.), Rio de Janeiro: Museu Nacional, 2013; 8th World Congress on Mummy Studies, Brazil, p. 94
ISBN 978-85-7427-048-7

Lindsay K, Rühli F, DeLeon V.

Revealing the face on an Egyptian: Synthesis of current and traditional approaches to evidence-based facial approximation

Book of abstracts, Rodrigues-Carvalho (ed.), Rio de Janeiro: Museu Nacional, 2013; 8th World Congress on Mummy Studies, Brazil, p. 94
ISBN 978-85-7427-048-7

Loynes R, Rühli F, David R, Chamberlain A.

Novel medical and Egyptological findings in a Swiss CT data collection of Ancient Egyptian mummies

Book of abstracts, Rodrigues-Carvalho (ed.), Rio de Janeiro: Museu Nacional, 2013; 8th World Congress on Mummy Studies, Brazil, p. 72.
ISBN 978-85-7427-048-7

van Schaik K, Rühli F.

Co-Morbidity index analyses of skeletons and soft tissue autopsy reports in an early 20th century swiss bone reference series

Supplement to the Paleopathology Newsletter, 40th Annual Meeting of Paleopathology Association, Knoxville, Tennessee, 9-10 April 2013, ISSN: 01484737

Seiler R, Rühl F.

Ancient odontogenic infectious pathologies: diagnostic procedures and correlative cases

Book of abstracts, Rodrigues-Carvalho (ed.), Rio de Janeiro: Museu Nacional, 2013; 8th World Congress on Mummy Studies, Brazil, p. 62
ISBN 978-85-7427-048-7

Seiler R, Rühli F.

"The opening of the mouth". A new perspective for an Ancient Egyptian mummification process

Book of abstracts, Rodrigues-Carvalho (ed.), Rio de Janeiro: Museu Nacional, 2013; 8th World Congress on Mummy Studies, Rio de Janeiro, Brazil.
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Wanek J, Speller R, Rühli F.

Direct action of radiation on mummified cells: modeling of computed tomography by Monte Carlo algorithms

Book of abstracts, Rodrigues-Carvalho (ed.), Rio de Janeiro: Museu Nacional, 2013; 8th World Congress on Mummy Studies, Brazil, p. 37

ISBN 978-85-7427-048-7

Selected presentations (oral and poster)

Rühli F.

The impact of paleopathology and evolutionary medicine for science and society

KAPO Meeting, Seoul National College of Medicine, Seoul, Korea, 19 January 2013

Horackova L, Rühli F.

Human Remains from the Tomb of Merneith at Saqqara

Conference on the Bioarchaeology of ancient Egypt, Cairo, Egypt, 31 January- 2 February 2013

Rühli F, Habicht M, Bowman A.

Canopic Jars: A new Source for the old Questions

Conference on the Bioarchaeology of ancient Egypt, Cairo, Egypt, 31 January- 2 February 2013

Staub K, Woitek U.

Lebensstandard messen: Verschiedene Zugänge für die Schweiz seit dem 19. Jh. aus globaler und lokaler Perspektive

3. Schweizerische Geschichtstage, Fribourg, February 2013

Staub K.

Veränderungen in der Körperhöhe und im Body Mass Index (BMI) in der Schweiz aus internationaler Perspektive als Indikatoren für den biologischen Lebensstandard seit dem 19. Jahrhundert

3. Schweizerische Geschichtstage, Fribourg, February 2013

Rühli F.

Transdisziplinarität Medphil F. am Beispiel des ZEM

Philosophy Faculty, UZH, Zürich, Switzerland, 22 March 2013

Rühli F.

Mumien und mehr

Rotay Club, Zürich, Switzerland, 25 March 2013

Rühli F, Böni T.

The Legacy of bone pathology reference series: Don Ortner and the Galler Collection

40th Annual Meeting of Paleopathology Association, Knoxville, Tennessee, 10 April 2013

Campana M, Nelly R, Rühli F, Tuross N.

Disease, death and DNA at Tepeolcolula Yucundaa, Oaxaca

The Society for American Archaeology conference, Honolulu, Hawaii, USA, 3-7 April 2013

Campana M, Tuross N, Rühli F.

Detection and identification of the microbiome in archaeological soft and hard tissues: a high-throughput DNA sequencing approach

The Society for American Archaeology conference, Honolulu, Hawaii, USA, 3-7 April 2013

Bowman A, Warinner C, Shved N, Akgül G, Trancik V, Rühli F.

Historic CCR5Δ32 frequency in Central Europe

82nd Annual Meeting of the American-Association-of-Physical-Anthropologists, Knoxville, USA, 9-13 April 2013

Häusler M, Reichlin T, Rühli F, Meyer S.

The first three victims examined from the 1806 landslide disaster at Goldau, Switzerland

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Krüttli A, Warinner C, Bouwman A, Della Casa P, Rühli F.

Investigating lactase persistence in a Medieval German cemetery: A step towards understanding the rise of the European lactase persistence polymorphism (-13910C/T)

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Meyer S, Bosschetti A, Hauri R, Häusler M.

A trepanned skull from the 19. century found in Steinhausen, Switzerland

82nd Annual Meeting of the American-Association-of-Physical-Anthropologists, Knoxville, USA, 9-13 April 2013

Meyer S, Schmid P.

The functional morphology of the hominoid fibula

The Annual Meeting of Paleoanthropology Society, Honolulu, Hawaii, USA, 2-3 April 2013

Rühli F, Saniotis A, Henneberg M.

Teaching secular trends of human anatomy in a novel Medical School module

American Association of Anatomy Meeting, Boston, USA, 22-24. April 2013

Jüni P, Fischer R, Staub K.

“Zu Wirkungen und Nebenwirkungen“ - Bringing an epidemiological live study into the theatre

Stadttheater Bern, Switzerland, April 2013

Rühli F.

Evolutionary Medicine: new clinical perspectives

Berlin Society of Friends of Natural Science, Blankensee, Germany, 26 April 2013

Rühli F

Evolutionary medicine: the study of disease evolution based on ancient samples

Life Science, PhD Program in Evolutionary Biology, Zürich, Switzerland, 30 April 2013

Rühli F.

Keynote lecture - Paleoradiology: The cause of death of Ötzi and Tutankhamun

2nd Congress of International Society of Forensic Radiology and Imaging, Zürich, Switzerland, 13-14 May 2013

Staub K, Lehmann A, Woitek U, Rühli F.

From growth in height to growth in breadth“: The changing body dimensions in Swiss and German conscripts since 1950 and its impact for epidemiological obesity research and possible endocrine explanations

20th European Congress on Obesity, Liverpool, UK, 12-15 May 2013

Rühli F.

Paleoradiology

2. Congress International Society of Forensic Radiology an Imaging, Zürich, Switzerland, 13 May 2013

Rühli F.

Evolutionary Medicine: Socio-economic and clinical perspectives of human changes

The Institute of Social and Preventive Medicine, University of Bern, 27 May 2013

Rühli F.

The Millenium Chronicle of Chronic Diseases

81st Annual Meeting of Swiss Society of General Internal Medicine (SGIM), Basel, Switzerland, 30 May 2013

Panczak R, Rühli F, Staub K.

The value and potential of medical data from Swiss conscription for health and social inequality research
Congress of the Swiss Sociological Association (SGS), Bern, 26-28 June 2013

Rühli F.

Evolutionary Medicine
Summer School, University of Nove Hradý, 11 June 2013

Rühli F.

"The saltmen of Iran", aDNA & histological analyses
2nd International Workshop, University of Bochum, Ruhr, Germany, 4 July 2013

Link K, Shved N, Berishvili G, Baghdadi-Serrano N, Mouttet F, D'Cotta H, Baroiller J-F, Reinecke M, Eppler E.

Effects of seawater and freshwater challenge on the brain-pituitary-glandular axes, osmoregulatory and immune systems in the salinity-tolerant black-chinned tilapia (*Sarotherodon melanotheron*)
17th International Congress of Comparative Endocrinology, Barcelona, Spain, 15-19 July 2013

Eppler E, Link K, Franz A, Shved N.

Signalling factors influencing the growth hormone/IGF and the immune system: phylogenetic aspects of neuro-endocrine-immune interactions
17th International Congress of Comparative Endocrinology, Barcelona, Spain, 15-19 July 2013

Bowman A, Rühli F.

Ancient DNA techniques and their applications to Mummy studies
8th World Congress on Mummy Studies, Rio de Janeiro, Brazil, 7 August 2013

Campana M, Tuross N, Rühli F.

Detection and identification of the microbiome in archaeological soft and hard tissues: a high-throughput DNA sequencing approach
8th World Congress on Mummy Studies, Rio de Janeiro, Brazil, 7 August 2013

Loynes R, Rühli F, David R, Chamberlain A.

An orthopaedic surgeons view of the mummy CT scans held at the ZEM (ZH)
8th World Congress on Mummy Studies, Rio de Janeiro, Brazil, 7 August 2013

Link K, Papageorgopoulou C, Gutteck U, Müller D, Rühli F, Van Hove M-L, Bianucci R.

Investigations of mediaeval mummified brains found in Belgium using chemical, radiological and histological techniques
8th World Congress on Mummy Studies, Rio de Janeiro, Brazil, 6-9 August 2013

Kreissl Lonfat B, Kaufman I, Rühli F.

A code of ethics for research with ancient human remains
8th World Congress on Mummy Studies, Rio de Janeiro, Brazil, 6-9 August 2013

Öhrström L, Seiler R, Böni T, Rühli F.

Cranial pathologies in ancient Egyptian mummies: Radiological findings in ancient Egyptian mummies from Swiss collections
8th World Congress on Mummy Studies, Rio de Janeiro, Brazil, 6-9 August 2013

Öhrström L, Fischer B, Bitzer A, Wallauer J, Walther M, Rühli F.

Terahertz imaging of mummified tissues
8th World Congress on Mummy Studies, Rio de Janeiro, Brazil, 6-9 August 2013

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8th World Congress on Mummy Studies, Rio de Janeiro, Brazil, 6-9 August 2013

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Revealing the face on an Egyptian: Synthesis of current and traditional approaches to evidence-based facial approximation
8th World Congress on Mummy Studies, Rio de Janeiro, Brazil, 6-9 August 2013

Wanek J, Rühli F.

Radiation damage on ancient cells: A Monte Carlo based study
8th World Congress on Mummy Studies, Rio de Janeiro, Brazil, 6-9 August 2013

Seiler R, Rühli F.

"The opening of the mouth". A new perspective for an Ancient Egyptian mummification process
8th World Congress on Mummy Studies, Rio de Janeiro, Brazil, 6-9 August 2013

Seiler R, Rühl F.

Ancient odontogenic infectious pathologies: diagnostic procedures and correlative cases
8th World Congress on Mummy Studies, Rio de Janeiro, Brazil, 6-9 August 2013

Staub K.

How did malnutrition during the bimodal crisis decade around 1850 and the economic depression in the 1880s affect growth of the human body
7th Conference of the European Society for Environmental History ESEH, Munich, Germany, August 2013

Panczak R, Rühli F, Woitek U, Staub K.

The Value of medical data from Swiss conscription for epidemiological research: Height, weight and BMI of 18-20 years old conscripts 1875-2009
Swiss Public Health Conference, Zürich, August 2013

Warriner C, Krüttli A, Bowman A, Tito, Rodrigues J, Vyas R, Speller C, Trachsel C, Grossmann J, Luder H, Schved N, von Merig C, Lews C, Gibert T, Collins M, Capellini E, Rühli F.

Ancient DNA and Paleoprotein Investigation of Dairying and the Evolution of European Diet
Schweizerische Gesellschaft für Ernährung, Zürich, Switzerland, August 2013

Öhrström L, von Waldburg H, Speier P, Suri R, Ludwig U, Bock M, Rühli F.

Imaging methods for mummified tissue: Comparative MR and CT Imaging
75th Annual Meeting of the Swiss Society for Anatomy, Histology, and Embryology (SSAHE), Fribourg, Switzerland, 6 September 2013

Burkhard M, Mathews S, Link K, Franke I, Rühli F, Harper G, Quereshi F, Bloch H, Ullrich O, Eppler E.

Uncemented glenoid metalback fixation: position of the superior implant screw in relationship to suprascapular nerve and scapular notch analysed in an anatomical cadaver dissection study
75th Annual Meeting of the Swiss Society for Anatomy, Histology and Embryology (SSAHE), Fribourg, Switzerland, 6 September 2013

Link K, Papageorgopoulou C, Gutteck U, Müller D, Rühli F, Van Hove M-L, Bianucci R.

Morphological, chemical, histological and radiological investigations of mediaeval mummified brains found in Belgium
75th Annual Meeting of the Swiss Society for Anatomy, Histology, and Embryology (SSAHE), Fribourg, Switzerland, 6 September 2013

Rühli F.

Evolutionary medicine: A new concept in biomedical education
75th Annual Meeting of the Swiss Society for Anatomy, Histology, and Embryology (SSAHE), Fribourg, Switzerland, 6 September 2013

Rühli F.

Mummies and skeletons: the value of ancient samples for modern medicine
Archaeology, Bioarchaeology and Cultural Heritage: relation between Research and Local Development, University of Sassari, 12 Sept 2013

Lehmann A, Rühli F, Woitek U, Staub K.

From growth in height to growth in breadth" – The change in body dimensions among German conscripts and its impact for epidemiological research
10th International Meeting of the German Society of Anthropology, Bolzano, Italy, September 2013

Landis S, Häusler M

The pathology of the proximal femur MLD 46 (*Australopithecus africanus*)

3rd Annual meeting of European Society for the study of Human Evolution, Vienna, Austria, 19-21 September 2013

Krütli A.

Was alte DNA mit Milch zu tun hat.

Zürcher Zirkel für Ur- und Frühgeschichte, 16. September 2013

Campana M.

High-throughput analysis of ancient DNA, microbiome and diseases

Seminar at the Institute of Anatomy, University of Zurich, Switzerland, 16 September 2013

Frater N, Peter S.

The functional morphology of the seventh cervical vertebra in primates

3rd Annual Meeting of European Society for the study of Human Evolution, Vienna, Austria, 19-21 September 2013

Hermanussen M, Aßmann C, Staub K, Groth. Final height, target height and the community.

European Society for Pediatric Endocrinology. Milano, Italy 20 September 2013

Rühli F.

Paläoradiologie: Antike Mumien im modernen MR.

16. Jahrestagung der Deutschen Sektion der International Society for Magnetic Resonance in Medicine (ISMRM), Freiburg, Germany, 19-20 September 2013.

Panczak R, Woitek U, Rühli F, Staub K.

Regionale und sozio-ökonomische Unterschiede im Body Mass Index (BMI) von Schweizer Stellungspflichtigen 2004-2012

2. Wissensaustausch MOSEB, Bundesamt für Gesundheit, Bern, October 2013

van Schaik K.

How sick were they? Modern medical comorbidity index to assess disease load in the past

11th Meeting of the Joint Atlantic Seminar of the History of Medicine, Harvard University, USA, 25-26 October 2013

Wanek J, Rühli F.

Cancer risk following CT-imaging: A Monte Carlo based study

3rd World Congress on Cancer Science & Therapy, San Francisco, USA, 21-23 October 2013

Jüni P, Fischer R, Staub K.

“Zu Wirkungen und Nebenwirkungen“ - Bringing a epidemiological live study into the theater

Schauspielhaus, Zürich, Switzerland, November 2013

Landis S, Häusler M.

The pathology of the proximal femur MLD 46 (*Australopithecus africanus*)

General Assembly of Schweizerische Gesellschaft für Anthropologie/ Arbeitsgemeinschaft für Historische Anthropologie der Schweiz, Geneva, 16 November 2013

Panczak R, Woitek U, Rühli F, Staub K.

“From growth in height to growth in breadth“ at the end of the 20th century – The latest development (and socio- economic/ regional differences) in Switzerland since 2004

Glücksburger Auxology Days, Glücksburg, Germany, November 2013

7.3 Book Chapters and Reports

Hermanussen M, Assmann C, Staub K.

The Community Effect in Swiss Conscripts

Auxology: Studying Human Growth and Development, Schweizerbart Verlag, 2013: 72-73

Staub K, Rühli F, Woitek U.

Impact and Pitfalls of Conscription Data.

Auxology: Studying Human Growth and Development, Schweizerbart Verlag, 2013: 146-149

Panczak R, Woitek U, Rühli F, Staub K.

Regionale und sozio-ökonomische Unterschiede im Body Mass Index (BMI) von Schweizer Stellungspflichtigen 2004-2012

Final report for Federal Office of Public Health (BAG), October 2013

7.4 Editorships

Editor *Anthropologischer Anzeiger / Journal of Clinical and Biological Anthropology* (Prof Frank Rühli)

Editor *Swiss Review of Military and Disaster Medicine* (Prof Frank Rühli)

Editor *HOMO / Journal of Comparative Human Biology* (Prof Frank Rühli)

Associate Editor *International Journal of Paleopathology* (Prof Frank Rühli)

Associate Editor *Journal of Evolutionary Medicine* (Prof Frank Rühli)

Associate Editor *Yearbook of Mummy Studies* (Prof Frank Rühli)

7.5 Thesis / PhD

Holloway K.

PhD: "Tuberculosis is an evolving disease: Paleoepidemiological and historical evidence"

Supervisors: Henneberg M, Henneberg R, De Barros Lopes M, Rühli F.

School of Medical Sciences Anatomy and Pathology, The University of Adelaide, February 2013

The PhD thesis has been awarded the "2013 University Doctoral Research Medal, The University of Adelaide".

8 Other activities

	Di 1.10.2013	Mi 2.10.2013	Do 3.10.2013	Fr 4.10.2013
8:00-9:00		Microevolution (Maciej, Hila) Y27-H-35/36	Diseases of the last 2 centuries (Thomas, Nakita) Y27-H-35/36	Forces of evolution (Maciej, Martin) Y27-H-35/36
9:00-10:00				
10:00-11:00		Short term adaptation of body shape (Kaspar, Radek) Y27-H-35/36	Hyperostosis frontalis interna: an exemplary case (Hila, Nakita) Y27-H-35/36	Discussion The future of mankind (Maciej, Martin) Y27-H-35/36
11:00-12:00				
12:00-13:00		Lunch	Lunch	Lunch
13:00-14:00	Prehistoric disease patterns (Martin, Nakita) Y22-G-74	Short term adaptation of body shape (Kaspar, Radek) meeting in Y42-G-70	Biodemography (Maciej, Martin) meeting in Y42-G-70	Talks preparation (Sabrina, Sandra, Nakita, Claudia, Giada) meeting in Y42-G-82
14:00-15:00				
15:00-16:00	Group work (Sabrina, Sandra, Nakita, Claudia) Y42-G-82	Swiss history of TB (Kaspar, Radek) TBD	Biodemography (Maciej, Martin, Sandra) TBD	
16:00-17:00				

Part of the three-week course in Evolutionary Medicine newly introduced in 2013 at the UZH Science Faculty.

Members of the ZEM contributed to various activities and events during the reporting period, some major ones are listed here exemplary:

Childrens University UZH:

Prof Frank Rühli, offered a course to school children age 10-12 about mummies and mummy research in May 2013.

Scientifica:

This time the main ZEM booth at the Scientifica (Zurich Science Days, UZH/ETHZ) in August 2013 was about lactase persistence research. Dr Bouwman and her team demonstrated to a diverse audience how milk changed from a high-risk nutrient in historical days to a basic nutrient nowadays. Furthermore, the ZEM research on the evolution of tuberculosis (lead by Dr Bouwman) was also one of the three highlighted parts of the “URPP Evolution in Action” Scientifica booth.



The main ZEM booth on lactase persistence research at the Scientifica 2013.

Academic teaching activities:

Prof Frank Rühli

Anatomy (clinical anatomy dissection course, lectures on locomotor system, topographic anatomy/ human biology; 1st and 2nd year of Medicine, Medical Faculty, UZH)

Paläopathologisches Kolloquium (course, UZH)

Evolutionary Medicine (module, Science Faculty, UZH)

Topics in Evolutionary Biology (lecture, Science Faculty, UZH)

Evolution and Human Health (course, Medical Faculty, University of Adelaide, Australia)

Dr Kaspar Staub

Evolutionary Medicine (module, Science Faculty, University of Zürich)

Quantitative methods of Economic History (lectures, Department of Economics, University of Zürich)

An Introduction to quantitative methods for historians (lectures, Institute of History, University of Bern)

Dr Martin Häusler

Evolutionary Medicine (module, Science Faculty, UZH)

Bioarchäologie: Archäologische Genetik (lecture series, Philosophical Faculty, UZH)

Clinical Anatomy (course, 2nd year Medicine, Medical Faculty, UZH)

Dr Lena Öhrström

Evolutionary Medicine (module, Medical Faculty, UZH)

Clinical Anatomy (course, 2nd year Medicine, Medical Faculty, UZH)

Dr Abigail Bowman

Evolutionary Medicine (module, Science Faculty, UZH)

Dr Karl Link

Clinical Anatomy (course, 2nd year Medicine, Medical Faculty, UZH)



Prof M. Henneberg (with M. Habicht, left) during his visit at the ZEM in October 2013.

International visits:

Among others the following people visited the ZEM during the reporting period:

Molebogeng Bodiba, Masterstudent, University of Pretoria

Almudena Devesa Peiro, Student, University of Valencia

Maria Lea Estermann, Internship, Universität Basel

Maciej Henneberg, Professor, Medical School, University of Adelaide
 Robert Loynes, MD, Centre for Biomedical Egyptology, Manchester
 Michael Westaway, PhD, Museum of Tropical Queensland, Brisbane

Academic mandates / other academic activities

Prof Frank Rühli

Vice-President, Swiss Society of Anthropology
 Member PhD Program in Integrative Molecular Medicine
 Member PhD Program in Evolutionary Biology
 Member of multiple thesis committees (MSc, MD, PhD)
 Reviewer for national and international grant bodies

Selection of peer-reviews for academic journals:

Prof Frank Rühli

American Journal of Physical Anthropology
 Annals of Internal Medicine
 International Journal of Legal Medicine
 International Journal of Osteoarchaeology
 Naturwissenschaften
 British Medical Journal
 PLOS One

Dr Kaspar Staub

Anthropologischer Anzeiger
 Homo
 Journal for Biosocial Science
 Annals of Human Biology
 Berner Zeitschrift für Geschichte
 Swiss Medical Weekly

Dr Abigail Bouwman

PLoS One
 Journal of Archaeological Sciences
 Quaternary Science Reviews
 Molecular Ecology

Dr Martin Häusler

American Journal of Physical Anthropology
 Science
 Journal of Anatomy
 Journal of Human Evolution

9 Media reports

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Eiszeit-Mumie: Ötzi hatte schlechte Zähne



Fotos ▶
DPA/ ZEM/ R.Seiler

Ein abgeschlagener Frontzahn, fortgeschrittene Parodontitis und Karies: Ötzi putzte Zeit seines Lebens vor rund 5300 Jahren wohl kaum seine Zähne - und das sieht man seinem Gebiss an.

📅 Dienstag, 09.04.2013 - 18:15 Uhr

🖨️ Drucken | 📧 Versenden | 📌 Merken

Gletschermann Ötzi plagten vor mehr als 5000 Jahren Karies und Parodontitis. Obendrein war einer seiner Frontzähne - vermutlich unfallbedingt - abgestorben, wie Forscher vom Zentrum für Evolutionäre Medizin (ZEM) der Universität Zürich nachweisen konnten.

Media report on ZEM research of dental pathologies of the Neolithic Iceman

The ZEM research on the oral pathologies of the Iceman was rated among the University of Zurich overall top 5 news causing the most attention by international media in 2013.

Selected print/online reports about ZEM members/activities:

Sonntagsblick, 06.01.2013
24heures online, 06.01.2013
20min online, 07.01.2013
TicinoNews online, 06.01.2013
20Minuten, 07.01.2013
Walliser Bote, 08.01.2013
Freier Schweizer, 18.01.2013
NZZ, 28.02.2013
Bündner Tagblatt, 01.04.2013
Blick am Abend, 09.04.2013
Der Tagesspiegel, 09.04.2013
Die Wochenzeitung, 11.04.2013
Der Bund, 19.04.2013
Blick, 11.04.2013
20min, 05.07.2013
Bild der Wissenschaft, 01.08.2013
NZZ, 16.08.2013
Popular science, 01.10.2013
Tagesanzeiger, 02.10.2013
Vvomagazin, 02.10.2013
NewScientist, 03.10.2013
NZZ, 16.10.2013
Dailymail, 28.10.2013
Sonntagszeitung, 03.11.2013
Le Matin Dimanche, 03.11.2013
Tages-Anzeiger, 03.11.2013
Der Landbote, 04.11.2013
Die Südostschweiz, 04.11.2013
20Minuten, 04.11.2013
Neue Luzerner Zeitung, 04.11.2013
Tages-Anzeiger, 04.11.2013
Der Bund, 04.11.2013
Zürichsee-Zeitung, 04.11.2013
St. Galler Tagblatt, 04.11.2013
Blick, 04.11.2013
Schaffhauser Nachrichten, 04.11.2013
Aargauer Zeitung, 04.11.2013
Neue Zürcher Zeitung, 04.11.2013
Berner Zeitung, 04.11.2013
Aargauer Zeitung, 05.11.2013
Oltener Tagblatt, 05.11.2013
Basler Zeitung, 06.11.2013
Basellandschaftliche Zeitung, 06.11.2013
La Tercera, 09.11.2013
Süddeutsche Zeitung, 11.11.2013
Discovery News, 12.11.2013
Die Weltwoche, 21.11.2013
Bulletin Bundesamt für Gesundheit, 47, 2013

Selected TV reports:

3sat, "Viren und Pandemien", 28.02.2014

CBS News, "King Richards "lion" heart also full of daisies", 28.02.2013

ARD, "Karl der Grosse", 01.05.2013

3Sat, Kurzfilm "Karl war wirklich gross", 02.08.2013

SRF 1, "Das Steinzeitrezept - Wie wir Zivilisationskrankheiten besiegen", 13.10.2013

SRF Fernsehen Tagesschau, 03.11.2013

SRF, Giacobbo/Müller, 03.11.2013

Selected radio reports:

Radio Top, 17.02.2013

Kultur kompakt, Radio SRF, 18.04.2013

SRF Horizonte, 13.10.2013

SRF Radio Regionaljournal, 05.11.2013

SRF Radio, Peter Schneider, 09.11.2013

10 Financial Support



CT scan of an Ancient Egyptian canopic jar at the Institute of Forensic Medicine, UZH (Lena Öhström)

We are most thankful to the enormous support by

the Mäxi Foundation

and all the other donors who allow us to run the ZEM as it is.

The following **research grants** were running during the reporting period:

University Research Priority Program (UFSP) “Evolution in Action: From Genomes to Ecosystems”
(Leaders: Prof U. Grossniklaus, Prof B. Keller, UZH; Prof Frank Rühli is part of one of six subproject)

Deutsche Forschungsgemeinschaft (DFG) (STO 458/12-1; Prof T. Stöllner, Universität Bochum, co-applicant: Prof Frank Rühli)

Foundation for Scientific Research UZH / Baugarten Foundation (Prof Frank Rühli)

Novartis Foundation for Biological and Medical Research (Prof Frank Rühli, co-applicants: Dr Tina Warinner, Dr Abigail Bouwmann)

Swiss Foundation for Nutrition Research (Dr Tina Warinner, co-applicants: Prof Frank Rühli, Dr Natallia Shved, Dr Abigail Bouwmann)

Federal Office of Public Health, BAG (Dr Kaspar Staub, co-applicants: Prof Frank Rühli, Prof Ulrich Woitek)

Zürcherische Winkelriedstiftung (Prof Rühli, co-applicants: Dr Kaspar Staub, Prof Ulrich Woitek)

Schweizerischer Nationalfonds (Dr Kaspar Staub, co-applicant: Prof Jüni, University of Berne)

Furthermore the **Medical Faculty UZH** thankfully supports the ZEM with an annual **Betriebskredit**.

The ZEM also received an **Investitionskredit** (for a Visualization table, 65'000.- CHF; co-applicants Prof. F. Rühli, Prof O. Ullrich).

Also, Frank Rühli has been given an **Einrichtungskredit** attached to his professorship.

11 ZEM Goals 2014



Members and affiliates (and some juniors...) of the ZEM at the summer barbecue event.

For the coming year we would like to achieve the following major goals:

- Continue major research projects locally and internationally (esp. molecular studies)
- Launch a teaching module in Evolutionary Medicine at the Medical Faculty, UZH
- New research staff appointments (esp. senior staff)
- Acquire additional external funding
- Award the first ZEM Grant

Impressum:

Prof Frank Rühli

Irina Rau

Dr Kaspar Staub

Dr Lena Öhrström

Zurich, April 2014

For more and the most recent information about the ZEM see also our websites:

www.evolutionarymedicine.ch

www.swissmummyproject.uzh.ch

The screenshot shows the homepage of the Zentrum für Evolutionäre Medizin (ZEM) at the University of Zurich. The header includes the title and navigation links. The main content area features a 'Welcome' message, a 'Spotlight!' section with a 'Programme' table, and social media links for Facebook and Twitter. The footer contains contact information and a note about the Swiss Mummy Project's new homepage.

The screenshot shows the homepage of the Swiss Mummy Project (SMP) at the University of Zurich. The header includes the title and navigation links. The main content area features a large image of an ancient mummy skull, a 'Contact' section with address and phone number, a 'Facebook' link, and a 'News' section with a list of recent events. The footer includes the University of Zurich logo and date.

You may also follow us on Facebook and Twitter:

<https://facebook.com/uzh.zem.ch>

<https://facebook.com/swissmummyproject>

We sincerely thank the Mäxi-Foundation for their most generous support!