



**University of
Zurich^{UZH}**

Institute of Anatomy – Centre for Evolutionary Medicine

Centre for Evolutionary Medicine

Annual Report 2011 (reporting period: 01.01.2011 - 31.12.2011)

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1 Management Summary



Headline on ZEM research

1.1 Management Summary

Dear friends, colleagues and supporters,

2011 marks the first full year of the ZEM!

We are still in the phase of getting fully operational, e.g. in terms of lab space. However, last year showed an already quite productive centre with all lot of on-going state-of-the-art scientific projects, an expanding number of international collaborators, and also additional successful funding acquisition. In the present annual report, you will find most of these ZEM highlights of this reporting period. Some were for example the mummy exhibition, the wide range of publications or the intensive participation at the World Mummy Congress in the US: However, please keep in mind that it is never possible to mention everything, and sometimes such little unspectacular daily business issues are the ones, which motivate, which challenge and which make work move forward.

Thanks to the generous support of the Mäxi Foundation as well as the general support by the University of Zurich (UZH), we were able to run the ZEM at a high level for the whole year. First result from ZEM projects are already published or will be in print soon. High-end science needs time, thus some results will pay off in the following year only. Yet, I am proud to say that I am quite satisfied with the progress we made in this past year. The beginning of a fresh initiative is always difficult, administrative challenges and other reluctances may slow down the initial expansion of such a project. This shall not be different for the ZEM, nevertheless, at this stage we have reached more than the critical mass and have now become a completely functional novel academic centre of its own.

Finally, my whole team and I would like again to cordially thank all the funding bodies, the University of Zurich (and in particular our line managers, Prof. O. Ullrich, Dean K. Grätz and Vice-Chancellor D. Wyler) and all other interested people who make this worldwide unique endeavour - to study the evolutionary aetiology of modern relevant medical issue in such a setting- possible.

Sincerely Yours



Frank Rühli, Head ZEM

Zurich, 15th of April 2012

1.2 Mauro Dell'Ambrogio:

«Congratulations to the ZEM for a Successful First Year»



Mauro Dell'Ambrogio, Swiss State Secretary for Education and Research

As the most recent member of the ZEM Honorary Committee I am pleased to witness the first steps of the Centre for Evolutionary Medicine as it establishes a number of very promising transdisciplinary projects. The breadth of experimental approaches at the cutting edge of science, combined with empathic information of the public at large about the goals, the major issues and results are most commendable. The excellent scientific training of Dr Frank Rühli owes much to the University of Zürich and an Institute of Anatomy with a long-standing reputation. This is a rigorous professional setting where scientific fascination for unexplored horizons is encouraged in the face of many technical, social, political challenges as well as sometimes superstitions and taboos. It is evidence of the competitiveness and professionalism of the new research groups, that they have obtained support not only from different charities but to a large extent also from the most demanding providers of peer-reviewed research funding such as the Swiss National Science Foundation and the German Research Foundation.

While national research administration often involves very complex negotiations with any number of stakeholders, it is gratifying to note that private charities recognize excellent research competence in Swiss universities and support brilliant scientific careers here and elsewhere with no red tape and only the strict minimum of bureaucratic constraints. The significant commitment of the Mäxi Foundation is a vibrant testimony of its confidence in the dedication and the individual responsibility of scientists. That highly original research on ancient mummies may contribute to our understanding of evolution and have relevance for the future of mankind is also a remarkable expression of hope. Personally, and I am sure, in the name of all the members of the Honorary Committee, I wish Dr Rühli a lot of success in guiding and motivating the ZEM research teams.

2 Mummy exhibit



Official flyer of the public ZEM exhibition

“Mummies: Man, Medicine, Magic” - Exhibition Topics

This exhibition from 23rd of September 2011 – 8th of January 2012 offered insight into the fascinating death cult in ancient Egypt and discussed different methods of mummification that exist (i.e. natural mummification through air, ice etc.) besides Egyptian mummification that was part of a religious ritual.

Various scientific techniques used in mummy research today such as tissue histology, radiological imaging and ancient DNA analysis also were presented.

A close look into a highly specialized ancient DNA lab for mummy research was made possible, computed tomographic images of ancient mummified bodies rendered in 3D could be viewed and a microscopic view of mummy tissues was also available.

An important aim of the exhibition was to show why this new knowledge matters and what it could mean for our future and medical progress of generations to come. In a white mummy capsule several bodies and body parts, some of the best-preserved mummies from Egyptian collections as well as e.g. an original bone piece of the Iceman were shown!



An overview of the exhibition with its central focus point, the white mummy capsule.

Mummy: Men Mummies provide us with a tangible connection to the past. Mummies are a testament to former historic and prehistoric eras. They encompass the values and knowledge of former cultures. The exhibited answered the following questions: What did former humans suffer from? Why were humans intentionally mummified? What does a thousand-year-old person look like?

Mummy: Medicine As deceased patients whose bodies retain evidence of former diseases and mummies are the subjects of medical research. Mummies can be scanned using modern radiological methods and can also be investigated genetically. Mummies thus enable us to study the evolution of diseases. The exhibited answered the following questions: Which investigative techniques do mummy researchers use? How can mummies and their medical conditions be analysed genetically? How do human beings and their illnesses change through time?

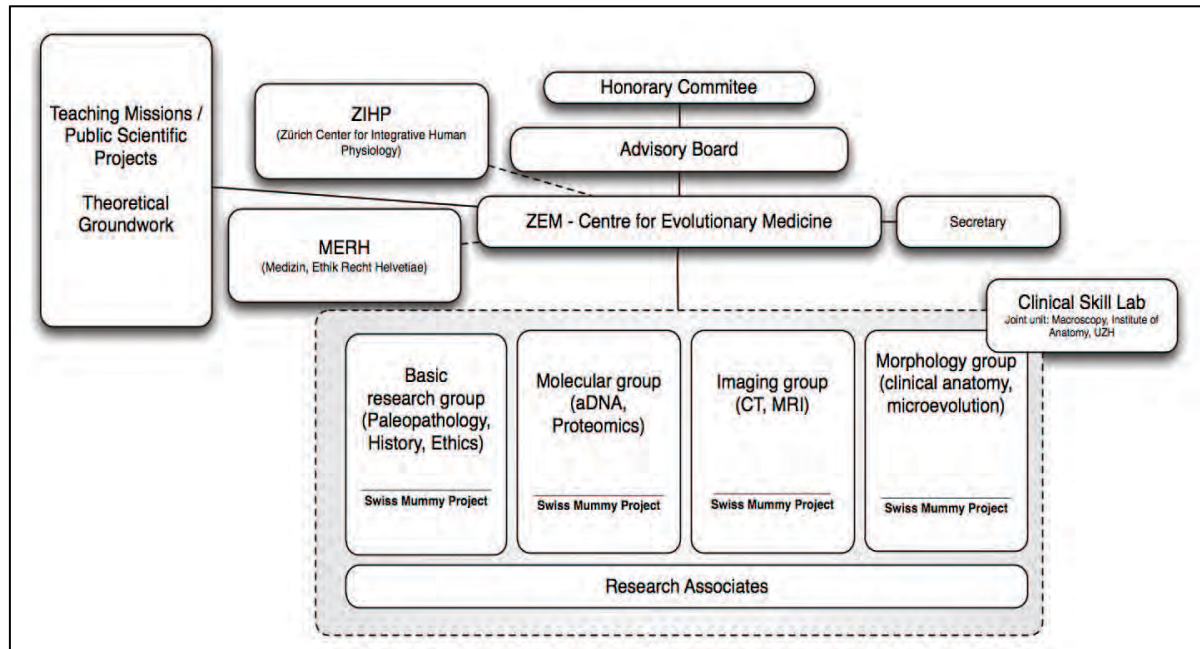
Mummy: Magic Mummies embody past cultural information, are witnesses to former religious visions and possess a special kind of magic. Mummies have the power to ignite the imagination – both positively and negatively. They are enigmatic and emanate something unfamiliar. The exhibited answered the following questions: What are the most important steps for mummification in ancient Egypt? What kind of special magic does a mummy have? Does the mummy's curse exist?



UZH Vice-Chancellor Ottfried Jarren and Prof. Susanne Bickel, Egyptologist, University of Basel presenting at the official opening ceremony

The exhibition was an overwhelming success. A total of approximately 8,000 people visited the exhibition during the 3½ months it was open to the public. This is even more striking taking into account that the format (duration, external funding, entrance fee) was a premier for the Irchel campus. Advertisement was done by official collaborations with Tamedia, Ticketcorner and VBZ. Main partners were Life Science Zurich UZH ETHZ, multiple national and international museums and research institutions as well as the Egyptology Seminar of the University of Basel. We from the ZEM hope that with this project we were able to push the Irchel campus to become in the future even more a major public place in Zurich to bring science and the public together.

3 The Centre for Evolutionary Medicine



Organisational setting of the ZEM

Aim

As an academic medical project, the **“Zentrum für Evolutionäre Medizin” (ZEM; Centre for Evolutionary Medicine)** 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 three main research units: a “biomolecular”, an “imaging” and a “morphology” 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.

The ZEM is a Research Unit of the Institute of Anatomy

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

International Collaborators

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

PD M. Bock, Deutsches Krebsforschungszentrum, Heidelberg

Prof. B. Bogin, Loughborough University, Loughborough, Leicestershire

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

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

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

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

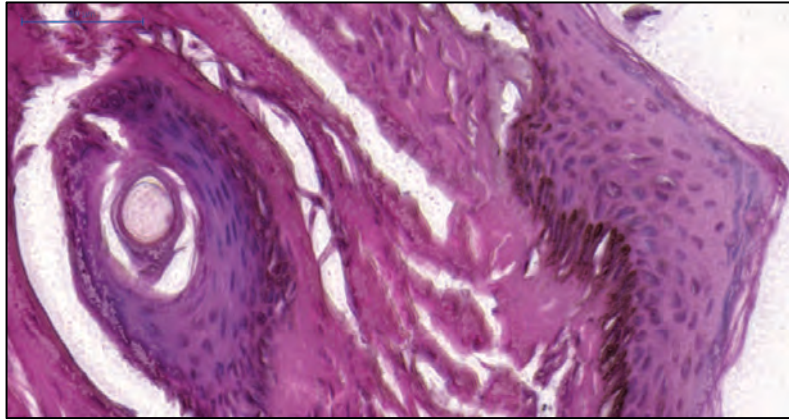
Prof. R. Schlapbach, Functional Genomics Center, UZH, ETH Zurich

Divisionär A. Stettbacher, Oberfeldarzt, Schweizer Armee, Bern

Prof. G. Székeley, Institut für Bildverarbeitung, ETH Zurich

Prof. U. Woitek, Institut für Empirische Wirtschaftsforschung, UZH

4 The Research Groups



Histology of ca. 2000-year-old Iranian Salt mummy's skin
(H&E 400X, K. Link)

4.1 The Molecular Group

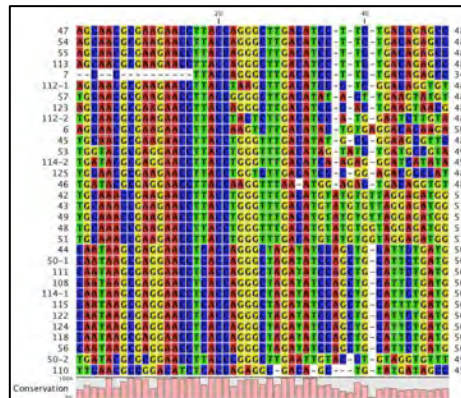
Dr Abigail Bouwman (since 1st of Sept)

Dr Natallia Shved

Dr Christina Warinner

Gülfirde Akgül, MSc, technician

Annina Krüttli, BA student (since 1st of Oct)



Alignment of 16S oral bacterial sequences recovered from ancient teeth. (C. Warinner)

- 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 European populations at different time points
- 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
- Iranian Salt Mummy Project:
 Problem: The origin of the mummified miners found in an Iranian salt mine are unknown
 Goal: Ancestry analysis and functional gene typing of Iron Age miners spanning 1000 years in time
- Artificial Mummification Project
 Problem: The impact of mummification on biomolecules is poorly described
 Goal: Characterize the role played by salt dehydration during mummification and its impacts on DNA preservation
- 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

4.2 The Imaging Group

Dr Lena Öhrström

Dr Dr Roger Seiler

Dr Roland Suri (1st of July - 30th of Sept)

Christina Sydler, MD thesis student

Johann Wanek, MSc Med Phys, PhD student



CT-based 3D reconstruction of an Egyptian mummy ("Schepenese", Stiftsbibliothek St. Gallen; R. Seiler)

- Swiss Mummy Project: State-of-the-art visualization of dental pathologies (e.g. of the Neolithic Iceman "Oetzi"):
 Problem: Few publications of detailed analysis of mummy dental pathologies exist
 Goal: Multimodality validation of post mortem dental status (mummies, anatomy bodies), correlative assessment of dental findings by CT and endoscopy
- 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 and real irradiation experiments
- CT-based assessment of relative soft tissue alteration in different types of ancient mummies
 Problem: No research addressed mummification specific alteration of tissue shrinkage
 Goal: To analyse shrinking of soft tissue between several types of mummies
- 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
- Diagnostic Application of terahertz imaging on ancient mummified tissues
 Problem: Very limited experience on applying terahertz-based imaging on ancient tissues
 Goal: To increase sample size of various ancient dry tissues investigated by terahertz
- Comparative CT/MR imaging of ancient mummified tissues:
 Problem: A single imaging technique is often insufficient for mummy investigations
 Goal: Semiquantitative analyses of tissues by multiple MR/CT (DECT) settings

4.3 The Morphology Group

Olia Bolshakova, med. dent.

Dr Martin Häusler (since 1st of Oct)

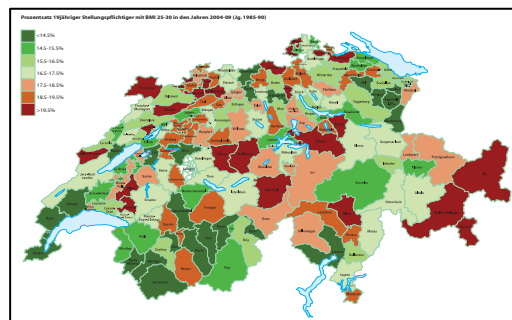
Dr Dr Karl Link

Dr Kaspar Staub

Katja Dageförde, external MD thesis student

Nicole Hofmann, M med. student

Kara Holloway, external PhD student



Percentage of 19-yr-old Swiss conscripts with Body Mass Index of 25-30 kg/m² (2004-2009, on district level, K. Staub)

- Multimodality study of ancient mummified brains:
 Problem: Naturally mummified brain tissue is rare and hardly ever analysed.
 Goal: Histological, GC-MS, micro-CT and micro-MRI analysis of mediaeval brains and evaluation of the level of tissue-specific preservation
- Histology analyses of a mammoth and the Iranian Salt mummies:
 Problem: Ice mummies and salt mummies are valuable rarities and seldom discovered
 Goal: To determine the tissue and mummification-specific preservation of multiple samples from the mammoth baby ‹Lyuba› and ancient Iranian Salt mummies
- Galler pathological bone reference series database:
 Problem: Historical pathology bone reference series are rare
 Goal: To complete an online database and to study various bone pathologies, e.g. manifestation of tuberculosis in the pre-antibiotic and post-antibiotic period
- Swiss Biological Standard of Living - study of Swiss Armed Forces conscripts 1875-2011:
 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
- Evolutionary adaptations of the hominid vertebral column to mechanical strains
 Problem: Back problems cause enormous health costs in modern humans
 Goal: to analyze the influence of upright, bipedal locomotion on low back problems based on paleoanthropological samples and to compare with clinical issues

4.4 The Basic Research Group: Paleopathology, History and Ethics

Dr Thomas Böni, co-head ZEM and research associate

Dr Urs Leo Gantenbein, research associate

Dr Philipp Gruber, research associate

Dr Ina Kaufmann (1st of July till 30th of Sept; since then: research associate)

Bettina Kreissl Lonfat, lic. phil.

2.1 Preamble

The ZEM as a part of the University of Zurich and thus as an institution of research and higher learning, is committed to three main goals: (1) contribute to scientific progress, (2) inform and teach a larger public and society in general about our research, and (3) show transparency in the goals that we follow, our protocols, and our research results. This code wishes to be understood as a communicative action of the researchers of the ZEM, collaborators and affiliated persons rather than a prescriptive set of rules or guidelines. It is formulated with the distinct wish to initiate a further discussion about the ethical dimensions and implications of medical research on mummies in particular and human remains in general, and to contribute to the more general goal of actively shaping sustainable research conditions.

First part of the ZEM Code of Ethics (see also www.evolutionarymedicine.ch; B. Kreissl Lonfat)

- Clinical Paleopathology Group

Problem: In Switzerland there is a 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.

- Ethics and Research with human remains

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

Goal: To develop and publish a ZEM code of ethics / ethical framework

4.5 Administration and Support

IT-responsible: Christoph Fellner

Project Manager Mummy exhibition: Dr Isabel Klusman (1st of March – 31st of Dec)

Secretary: Bettina Kreissl Lonfat, lic.phil. (Silvia Ittensohn till 30th of April)

International research associates:

Maria Ines Hofmann, Chile

Arthur Saniotis, Australia

General ZEM support by Institute of Anatomy UZH

HR-secretary: Marianne Ott

Photographer: Heinz Sonderegger

Histology technician: Charlotte Burger

5 The Facilities



C. Warinner working in the clean lab

5.1 New Offices

The ZEM was able to acquire a total of three newly constructed and newly refurbished office rooms on the Y 42 G- Floor.

5.2 The aDNA Clean Lab

The Clean Lab that was established in collaboration with the Swiss Science Foundation (SNF) in 2010, is a state-of-the-art laboratory for the extraction and analysis of ancient DNA from historical samples such as bone, mummified tissue or coprolites. More technical equipment has been installed in the aDNA Clean Lab during the reporting period.

As part of the molecular group facilities, the ZEM also co-funded a high accuracy mass spectrometer:

Current News

Prof. Dr. Ralph Schlapbach, Head Functional Genomics Centre



Together with the Functional Genomics Center Zurich, the Centre for Evolutionary Medicine acquired a latest generation high accuracy mass spectrometer for proteomics research. The LTQ Orbitrap Velos system, also called a "Hybrid Linear Ion Trap - Orbitrap Electrospray Mass Spectrometer" can be considered today's most versatile instrument for the investigation of proteins in complex biological samples. Having this technology available at ZEM and FGZ not only allows the researchers to investigate highly complex biological samples and to investigate individual peptides and proteins, but also to evaluate the overall composition of the proteome, i.e. the collective identity of all measurable proteins in cells and tissues. Together with the option to identify and characterize post-translational modifications of peptides and proteins, the technology enables the researchers to gather comprehensive overviews of the protein or even proteome status of the organism under investigation. Taking advantage of the system capabilities, large numbers of proteins can not only be identified but also quantified at high accuracy using algorithmic and chemical methods in combination. Technically, the overall LC-MS/MS system consists of an ultra-high performance liquid chromatography system for the separation of complex protein and peptide mixtures present in biological tissue or cell culture samples, an electrospray ionization unit is used to softly ionize biomolecules (bring charges to the molecules in a fine aerosol so they can enter the mass spectrometer), and a combination of two mass analyzers: the LTQ Velos- linear ion trap part is perfectly suited for very sensitive and fast mass analysis while the second mass analyzer, the Orbitrap, is used for the determination of accurate masses with high resolution. With this powerful analytical system at hand, the researchers of the ZEM are well equipped for all proteomics research projects of today and the future years.

Source: ZEM-Newsletter 2, Spring 2011

5.3 The Dry Specimen Storage Room

The Centre for Evolutionary Medicine houses a couple of important research collections (bone samples, mummies, histological slides etc.). The dry specimen storage room was moved to a new place during 2011 and is now fully equipped, e.g. with two computer workstations and a large stock of excavation tools.



Storage area e.g. for the Galler bone pathology reference series

5.4 The Clinical Skills Lab



New infrastructure such as fully ventilated dissection tables

The Clinical Skills Lab was inaugurated in 2011. It is a joint facility of the Division of Gross Anatomy and the Centre for Evolutionary Medicine (ZEM). The Skills Lab's main goal is to offer an environment where clinics, surgeons and doctors can gain access to the Institute's body donations in a controlled environment and where they can establish new surgery protocols, attend postgraduate education in clinical anatomy or perform research.

5.5 The New Dry and Wet Lab

These rooms were gradually moved into towards the end of the year and will be fully operational later in 2012. They serve as the main areas to cut, dissect and further analyze dry and wet tissue samples, respectively

6 Past dates with ZEM participation



R. Seiler presenting latest ZEM data of oral pathologies of "Ötzi", 2nd Bolzano Mummy Congress, October 2011

Members of the ZEM presented their scientific work at various conferences in 2011, the most important ones were the following:

30 March- 3 April: Society for American Archaeology, Sacramento, CA, USA (Dr Christina Warinner)

10-12 April: American Association of Anatomists (AAA)/ Experimental Biology Conference Washington DC (PD Frank Rühli)

12-16 April: American Association of Physical Anthropologists (AAPA) Minneapolis (PD Frank Rühli, Kara Holloway)

12-16 June: 7th International Mummy Congress, San Diego (PD Frank Rühli, Dr Ina Kaufmann, Dr Roger Seiler, Dr Christina Warinner)

12-16 September: 9th International Congress of the German Society for Anthropology (GfA) (PD Frank Rühli, Bettina Kreissl Lonfat, Dr Karl Link, Dr Natallia Shved, Dr Kaspar Staub, Johann Wanek)

16-20 September, 1st International Symposium on Ancient Cadaver Protection and Research, Changsha, China (Dr Christina Warinner)

20-22 October: 2nd Bolzano Mummy Congress - Mummies from the Ice, Bolzano (PD Frank Rühli, Dr Karl Link, Dr Roger Seiler)

7 Missions and Affiliations



F. Rühli and colleagues at the CT scanning of an ancient mummy in Gaborone (Botswana), August 2011

Chehrabad Saltmummy and Saltmine Exploration Project (Iran) (PD 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) and the Cultural Heritage, Tourism and Handcraft Organisation of Zanzan, Iran.

www.saltmen-iran.com



Arrival of a Salt mummy for CT Scanning, Tehran, September 2011

The Leiden Excavations in the New Kingdom necropolis at Saqqara (Egypt) (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). *The ZEM participation was de facto suspended in 2011 due to the political turmoil in Egypt. More work will be done in 2012.*

www.saqqara.nl

Mummy Project Botswana

Frank Rühli was invited by Prof Steyn, University of Pretoria, and colleagues to examine one of the only sub-Saharan mummies found to date in Botswana.

Members of the ZEM are also affiliated to these institutions:

- **Zentrum für Integrative Humanphysiologie, UZH** (PD Frank Rühli)
- **Kompetenzzentrum Mediävistik UZH** (PD Frank Rühli, KD Thomas Böni, Dr Urs Leo Gantenbein, Dr Roger Seiler)

- **Medizinhistorisches Insitut und Museum, UZH** (PD Frank Rühli, KD Thomas, Böni, Dr Urs Leo Gantenbein, Dr Roger Seiler)
- **KompetenzzentrumMedizin, Ethik Recht Helvetiae, UZH** (PD Frank Rühli)
- **Indian Institute of Morphology, Kolkota** (PD Frank Rühli)
- **Department for Human Evolutionary Biology, Harvard University** (PD Frank Rühli)

8 Publications



One of the ZEM publications in 2011

8.1 Original Papers and Reviews

Haeusler M, Schiess R, Boeni T.

New vertebral and rib material point to modern bauplan of the Nariokotome *Homo erectus* skeleton.
J Hum Evol. 2011, 61:575-582.

Henneberg M, Rühli FJ, Gruber P, Woitek U.

Alanine Transaminase Individual Variation Is a Better Marker Than Socio-Cultural Factors for Body Mass Increase in Healthy Males
Food Nutr Sci. 2011, Dec;2(10):1054-1062.

Kaempfer T, Duerst E, Gehrig P, Roschitzki B, Rutishauser D, Grossmann J, Schoedon G, Vallelian F, Schaer DJ.

Extracellular hemoglobin polarizes the macrophage proteome toward Hb-clearance, enhanced antioxidant capacity and suppressed HLA class 2 expression.
J Proteome Res. 2011, May 6;10(5):2397-408.

Lee YC, Solomon LB, Rühli FJ, Schiess R, Öhrström L, Sullivan T, Alkadhi H, Henneberg M.

Confirmation of microevolutionary increase in spina bifida occulta among Swiss birth cohorts.
Eur Spine J. 2011, May;20(5):776-80.

Papageorgopoulou C, Suter S, Rühli F, Siegmund F.

Harris Lines Revisited: Prevalence, co-morbidities and possible aetiologies.
Am J Hum Biol. 2011, 23: 381-91.

Saniotis A, Henneberg M.

Medicine could be constructing human bodies in the future.
Med Hypotheses. 2011, Oct;77(4):560-64.

Schoch T, Staub K, Pfister C.

Social inequality, the biological standard of living, and body shapes. An analysis of Swiss conscription data 1875-1950.
Econ Hum Biol. 2011, 10(2):154-73.

Shved N, Berishvili G, Mazel P, Baroiller J-F, Eppler E.

Growth hormone (GH) treatment acts on the endocrine and autocrine/paracrine GH/IGF-axis and on TNF- α expression in bony fish pituitary and immune organs
Fish Shellfish Immunol. 2011, 31(6):944-952.

Solomon LB, Hussenbocus S, Hoffman J, Howie DW, Rühli F.

Unusual outcomes of neck of femur fractures: from acetabulisation of the femur to ankylosis of the femoral head.
Injury. 2011, 42(11):1336-41.

Staub K.

Grösser – und dicker. Körperhöhe und Body Mass Index im Kanton Bern seit dem 19. Jahrhundert.
Bern Zeitschr Gesch. 2011, 73(4)3-39.

Staub K, Rühli F, Bogin B, Woitek U, Pfister C.

Edouard Mallet's early and almost forgotten study of the average height of Genevan conscripts in 1835.
Econ Hum Biol. 2011, 9(4):438-442.

Staub K, Rühli F, Woitek U, Pfister C.

The average height of 18- and 19-year-old conscripts (N=458 322) in Switzerland, 1992-2009, and the secular height trend since 1878.
Swiss Med Wkly. 2011, 141:w13238.

Staub K, Rühli FJ, Woitek U, Pfister C.

BMI distribution/ social stratification in Swiss conscripts from 1875 to present.
Europ J Clin Nutr. 2011, 64(4):335-340.

Wanek J, Székely G, Rühli F.

X-ray absorption-based Imaging and its limitation in Differentiation of Ancient Mummified Tissue.
Skel Radiol, 2011, 40(5):595-601.

Warinner C, d'Alpoim Guedes J, and Goode D.

Paleobot.org: Establishing open- access online reference collections for archaeobotanical research.

Veget Hist Archaeobot. 2011, 20(3):241-244.

8.2 Published Abstracts and Presentations

Published abstracts

Akgül G, Link K, Baroiller J-F, Reinecke M, Eppler E.

Influence of salinity challenge on natriuretic peptides in a euryhaline teleost?

Anatomy (Intern J Exper Clin Anat). 2011, 5(Suppl: 1):S79, pp. 106.

Bianucci R, Brothwell D, van der Sanden W, Papageorgopoulou C, Gostner P, Pernter P, Egarter-Vigl E, Maixner F, Janko M, Piombino-Mascoli D, Mattutino G, Rühli F, Zink A.

Zweeloo Woman: Multidisciplinary Investigation of a Bog Body.

Proceedings 7th World Congress on Mummy Studies. Amer Assoc Advanc Sci, Vol. 30/I, pp. 110-111, 2011, June.

Dagefoerde K, Rühli FJ.

Evidence Based Paleopathology: Meta-analysis of PubMed-listed Scientific Studies on Pre-Columbian, South American Mummies.

Proceedings 7th World Congress on Mummy Studies. Amer Assoc Advanc Sci, Vol. 30/I, pp. 115, 2011, June.

Gallien V, Papageorgopoulou C, Bianucci R, Dietrich A, Guillon F, Rentsch K, Raghavan M, Hofmann M-I, Colacicco G, Rühli F.

A Medieval Infant Burial from Quimper (Bretagne-France): An Example of Brain Preservation in Wetland.

Proceedings 7th World Congress on Mummy Studies. Amer Assoc Advanc Sci, Vol. 30/I, pp. 115, 2011, June.

Holloway K, Link K, Rühli FJ, Henneberg M.

Skeletal lesions of human tuberculosis: changes from the past into the antibiotic era.

Anthropol Anz. 2011, Sep;68(4):499-500.

Kaufmann I, Rühli FJ.

Stakeholder Theory for Ancient Mummy Research.

Proceedings 7th World Congress on Mummy Studies. Amer Assoc Advanc Sci, Vol. 30/I, pp. 62-63, 2011, June.

Kreissl Lonfat BM, Lynnerup N, Rühli FJ.

Theoretical and Historical Background.

Proceedings 7th World Congress on Mummy Studies. Amer Assoc Advanc Sci, Vol. 30/I, pp. 62, 2011, June.

Kreissl Lonfat BM, Rühli F.

Appraisal of a problem: ethical dimensions of evidence-based research on human remains.

Anthropol Anz. 2011, Sep;68(4): 505

Link K, Papageorgopoulou C, Rühli F.

Lyuba (41,910 BP), a Baby Woolly Mammoth (*Mammuthus primigenius* Blumenbach, 1799): Histological Findings.

Proceedings 7th World Congress on Mummy Studies. Amer Assoc Advanc Sci, Vol. 30/I, pp. 116-117, 2011, June.

Öhrström L, Bitzer A, Walther M, Böni T, Colacicco G, Rühli FJ.

Terahertz Imaging of Ancient Mummies.

Proceedings 7th World Congress on Mummy Studies. Amer Assoc Advanc Sci, Vol. 30/I, pp. 114, 2011, June.

Öhrström L, von Waldburg H, Speier P, Bock M, Rühli FJ.

Comparative CT and MR Imaging of Ancient Mummified Tissues.

Proceedings 7th World Congress on Mummy Studies. Amer Assoc Advanc Sci, Vol. 30/I, pp. 114-115, 2011, June.

Öhrström L, von Waldburg H, Speier P, Bock M, Rühli FJ.

Comparative CT and MR Imaging of Ancient Mummies.

Anthropol Anz. 2011, Sep;68(4): 511-512.

Publications

Panzer S, **Wanek J**, Papageorgopoulou C, **Shved N**, Colacicco G, **Rühli FJ**.

Modeling Ancient Egyptian Mummification Methods Using Evidence Based Methodology: MRI, CT Analysis.
Proceedings 7th World Congress on Mummy Studies. Amer Assoc Advanc Sci, Vol. 30/I, pp. 90-91, 2011, June.

Papageorgopoulou C, **Shved N**, **Rühli FJ**.

Post-mortem Alterations of Mummified Human Tissue under Experiment Setting.
Proceedings 7th World Congress on Mummy Studies. Amer Assoc Advanc Sci, Vol. 30/I, pp. 90, 2011, June.

Papageorgopoulou C, **Shved N**, **Wanek J**, Colacicco G, **Rühli FJ**.

Modeling Ancient Egyptian Mummification Method Using Evidence Based Methodology: Histological Analysis.
Proceedings 7th World Congress on Mummy Studies. Amer Assoc Advanc Sci, Vol. 30/I, pp. 90, 2011, June.

Rühli FJ, Lynnerup N.

Introduction to Applied Ethics of Ancient Mummy Research.
Proceedings 7th World Congress on Mummy Studies. Amer Assoc Advanc Sci, Vol. 30/I, pp. 62, 2011, June.

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Proposal for an Ethical Framework for Ancient Mummy Research.
Proceedings 7th World Congress on Mummy Studies. Amer Assoc Advanc Sci, Vol. 30/I, pp. 63, 2011, June.

Rühli FJ.

The Value of Ancient Mummified Tissue for Clinical Research: A Perspective.
Proceedings 7th World Congress on Mummy Studies. Amer Assoc Advanc Sci, Vol. 30/I, pp. 116, 2011, June.

Rühli FJ, Abar A, Aali A, Boenke N, Brothwell D, Pollard M, Saedf S, Stollner T.

The Chehr Abad Salt Men (1,500-2,500 BP) – A Multidisciplinary International Mummy Research Project.
Proceedings 7th World Congress on Mummy Studies. Amer Assoc Advanc Sci, Vol. 30/I, pp. 116, 2011, June.

Rühli FJ, Papageorgopoulou C.

Introduction: Human Experimental Mummification.
Proceedings 7th World Congress on Mummy Studies. Amer Assoc Advanc Sci, Vol. 30/I, pp. 89, 2011, June.

Rühli FJ, **Zink A**, Lynnerup N.

Introduction to State-of-the-Art Ancient Mummy Research.
Proceedings 7th World Congress on Mummy Studies. Amer Assoc Advanc Sci, Vol. 30/I, pp. 102, 2011, June.

Rühli FJ, Lynnerup N.

CT and MR Imaging of Ancient Mummies.
Proceedings 7th World Congress on Mummy Studies. Amer Assoc Advanc Sci, Vol. 30/I, pp. 102, 2011, June.

Rühli FJ, **Wanek J**.

State-of-the-Art High Resolution Imaging of Ancient Mummified Tissue.
Proceedings 7th World Congress on Mummy Studies. Amer Assoc Advanc Sci, Vol. 30/I, pp. 102, 2011, June.

Shved N, Haas C, **Warinner C**, Paulsen K, Papageorgopoulou C, **Rühli FJ**.

Experimental human tissue salt mummification and DNA degradation analysis.
Anthropol Anz. 2011, Sep;68(4):523.

Shved N, Papageorgopoulou C, Paulsen K, Haas C, **Rühli FJ**.

Swiss Mummy Project: Experimental Human Tissue Mummification and Post-mortem DNA Degradation.
Proceedings 7th World Congress on Mummy Studies. Amer Assoc Advanc Sci, Vol. 30/I, pp. 90-91, 2011, June.

Staub K, Hermanussen M, **Woittek U**, **Rühli FJ**.

Regional variance in average height of 19-years-old conscripts in Switzerland in 1884-1891 and 2006-2009, and recent overweight prevalence on district level. Anthropol Anz. 2011, Sep;68(4):524-525.

Staub K, **Rühli FJ**, Schoch T, **Woittek U**, Pfister C.

Social and regional stratification in Body Mass Index of 18-and 19-year-old Swiss conscripts 1992-2009 (N=460 + 887) and its secular trend since 1875.
Amer J Phys Anthropol. 2011, 144(Suppl. 52):283-284.

Publications

Seiler R, Rühli FJ.

Dental Studies.

Proceedings 7th World Congress on Mummy Studies. Amer Assoc Advanc Sci, Vol. 30/I, pp. 103, 2011, June.

Seiler R, Zink A, Gostner P, Egarter-Vigl E, Rühli FJ.

Dental Pathologies of the Iceman.

Proceedings 7th World Congress on Mummy Studies. Amer Assoc Advanc Sci, Vol. 30/I, pp. 115, 2011, June.

Sydler C, Böni T, Woitek U, Rühli FJ.

CT-based Assessment of Relative Soft Tissue Alteration in Different Types of Ancient Mummy.

Proceedings 7th World Congress on Mummy Studies. Amer Assoc Advanc Sci, Vol. 30/I, pp. 117, 2011, June.

Wanek J, Parvin L, Rühli FJ.

X-ray Imaging and its Impact on Ancient DNA: A Monte Carlo-based Simulation.

Proceedings 7th World Congress on Mummy Studies. Amer Assoc Advanc Sci, Vol. 30/I, pp. 140, 2011, June.

Wanek J, Rühli FJ.

X-ray Imaging and the Probability to Damage Ancient Cells: A Monte Carlo based Study.

Anthropol Anz. 2011, Sep;68(4):528.

Warinner C, Shved N, Link K, Rühli FJ.

Archaeogenetic and Histological Analysis of Natural Mummification under High Salt Conditions: Investigation of the Chehr Abad Salt Men (1,500-2,500 BP).

Proceedings 7th World Congress on Mummy Studies. Amer Assoc Advanc Sci, Vol. 30/I, pp. 116, 2011, June.

Presentations (in addition to the above listed conference presentations)**Link K, Papageorgopoulou C, Rühli F.**Ice mummy Lyuba (41,910 BP), a baby woolly mammoth (*Mammuthus primigenius* Blumenbach, 1799): histological comparison with the African elephant (*Loxodonta africana*).

2nd Bolzano Mummy congress: Mummies from the Ice. Bolzano, Italy

Rühli FJ.

Evolutionary Medicine: Molecular Diagnostic on Ancient Mummies and its Clinical Impact

Weiter- und Fortbildungs-Symposium Molekulare Diagnostik 2011, Roche, UKS UZH Zurich

Rühli FJ.

Hypothyreosis- a medical (bone) perspective

Workshop ‚Sickness, hunger, war and religion from the perspective of archaeology, history and anthropology‘, Munich, Germany

Rühli FJ.

Patient Tutanchamun und weitere medizinische Einblicke in altägyptische Mumien

Kölnisches Stadtmuseum, Köln (D) – Rahmenveranstaltung der Ausstellung „Tutanchamun – sein Grab und seine Schätze“

Rühli FJ.

Geschichten von Mumien und Skeletten

GV Förderverein Spielzeugmuseum Depuoz, Zurich

Rühli FJ.

Mumien – Was uns historische Körper erzählen

Kinderuniversität, UZH, Zurich

Rühli FJ.

Mumien – Boten der Unsterblichkeit

Scientifica – Zürcher Wissenschaftstage 2011

Publications

Rühli FJ.

Mumien – Was wir von ihnen lernen können

Zunftabend der Vereinigten Zünfte zur Gerwe und zur Schumachern Zürich

Rühli FJ.

Evolutionary Medicine: Diseases in ancient mummies and changing modern bodies

Lecture, Department of Anatomy, Masaryk University, Brno, Czech Republic

Rühli FJ.

Tutankhamun: His mummy and his medical record

Lecture, Department of Anatomy, Masaryk University, Brno, Czech Republic

Rühli FJ.

Berühmte Mumien

Seniorenuniversität Zurich

Rühli FJ.

Forschung an Mumien

Tertianum Residenz Zurich Enge

Rühli FJ.

Ancient Mummies and Modern Mummies

Rotary Club Zurich Belvoir International

Rühli FJ.

Evolutionary medicine: ancient bodies and modern medicine

MD PhD MSc Retreat, Wislikofen

Rühli FJ.

Die Geheimnisse der Mumien

Treffpunkt Science City, Zurich

Rühli FJ.

Leben nach dem Tod – medizinische Forschung an Mumien

Kirchlich-kulturelles Forum Gemeindeverein St. Peter, Zurich

Rühli FJ.

Ancient biological samples to study the evolution of disease

Tecan Symposium, Shanghai, China

Rühli FJ.

Mumien: Tod und Ethik

Rahmenveranstaltung der Ausstellung „Mumien: Mensch Medizin Magie“, UZH Zurich

Rühli FJ.

Mumien: Mensch, Medizin, Magie

Volkshochschule Kanton Zurich

Rühli FJ.

Evolutionary Medicine: Lessons from the Past for our Future

GMEC Scientific Keynote Lecture, Singapore

Rühli FJ.

Medico-diagnostic imaging of ancient samples: impact and pitfalls

ZIHP UZH Minisymposium, Zurich

Rühli FJ.

Jahrtausendalte Gewebe und ihre aktuelle Bedeutung

Thommen Medical, After Work Apéro, Zurich

Publications

Rühli FJ.

The salt-men of Zanjan: tracing old miners by help of modern research techniques
Deutsches Bergbaumuseum Bochum

Rühli FJ.

Ein Blick ins Innere: Peruanische Hockermumie und die priestermumie nes-Schu
Rahmenveranstaltung der Ausstellung „Mumien: Mensch Medizin Magie“, UZH Zürich

Rühli FJ.

Medical Research on Ancient Mummies: Impact and Pitfalls
Harvard University, Cambridge, USA

Rühli FJ.

Paläopathologie: Oetzi, Tutanchamun und mehr...
Interne Fortbildung, Radiologie Kantonsspital Baden

Rühli F.

Ancient mummies and evolutionary medicine
Genética e Biologia Evolutiva IBUSP, University of Sao Paolo, Brazil

Rühli FJ, Egarter-Vigl E, Pedrotti A.

Round Table-Session IV: The Death of the Ice Man.
2nd Bolzano Mummy congress: Mummies from the Ice. Bolzano, Italy

Rühli FJ, Heiniger T.

Medizinische Forschung und Spitzenmedizin in Zürich
Moderiertes Ferierabendgespräch, Metropol, FDP 1+2 Zurich

Rühli FJ, Henneberg M.

Evolutionary Medicine: Microevolution of human morphology and its medico-social impact
Experimental Biology Association Conference, Washington DC, USA

Rühli FJ, Schmutz B.

A new "clinical" approach to assess secular change of femoral morphology: Would modern anatomically pre-contoured fracture fixation implants fit the Neolithic Iceman?
2nd Bolzano Mummy Congress: Mummies from the Ice, Bolzano, Italy

Seiler R.

Dental and other pathologies of the past
Oral Biology Colloquium, Zurich

Seiler R.

Zahnpathologien
„Diagnostik an alten Skelettfunden – Klinischpaläopathologisches Kolloquium
Arbeitsgemeinschaft Historische Anthropologie der Schweiz, Zurich

Staub K.

Medizinische und sozioökonomische Forschung mit Rekrutierungsdaten.
Institut für Wehrmedizinostatistik und Berichtswesen der Bundeswehr, Andernach, Germany

Staub K.

Historical perspectives on hypothyroidism in Switzerland. Endemic iodine deficiency, goitre and cretinism since the late 19th century
Workshop ‚Sickness, hunger, war and religion from the perspective of archaeology, history and anthropology‘, Munich, Germany

Staub K.

Der biologische Lebensstandard in der Schweiz 1800-2010. Einblicke in fast 10 Jahre Forschung durch die Neue Historische Anthropometrie in der Schweiz
Department of Economics, University of Zürich, Zürich

Staub K.

Challenging perspectives in evolutionary medicine: Microevolution of human morphology
23rd Annual Human Behavior and Evolution Society (HBES) Conference, Montpellier, France

Staub K.

Überblick über fast 10 Jahre Forschung durch die Historische Anthropometrie in der Schweiz seit 2002
Jahresversammlung der Schweizerischen Gesellschaft für Anthropologie

Staub K.

From growth in height to growth in breadth”: The changing body in Switzerland since the 19th century
SSHB Symposium ‘The Human Biology of Jim Tanner’, University of Cambridge, Cambridge, UK

Staub K, Rühli FJ, Schoch T., Woitek U. Pfister C.

Social and regional stratification in Body Mass Index of 18- and 19-year old Swiss conscripts 1992-2009 (N=460'887) and its secular trend since 1875
Annual Meeting American Association of Physical Anthropologists, Minneapolis, USA

Warinner C.

From the ground up: advances in stable-isotope based paleodietary inference
Society for American Archaeology, Sacramento, CA, USA

Warinner C.

Archaeogenetic and histological analysis of salt mummification under natural and artificial conditions
1st International Symposium on Ancient Cadaver Protection and Research, Changsha, China

8.3 Books and Book Chapters

Hotz G, Lecoq C, Bürlü L, Mischke J, Böni T, Seiler R, Rühli F.

Die Dame aus der Barfüsserkirche Basel, Paläopathologische Untersuchungen der weiblichen Mumie aus der Barfüsserkirche unter Berücksichtigung der historischen Quellen. In: Neumann W (editor), Geschichte und Tradition der Mumifizierung in Europa, Beiträge zu einer Tagung im Museum für Sepulchralkultur 2010, Kasseler Studien zur Sepulchralkultur, Band 18, Arbeitsgemeinschaft Friedhof und Denkmal e. V., Kassel. 2011, S.121-137.

Rühli F. (Ed)

Mumien: Mensch, Medizin, Magie Aktuelle Forschungserkenntnisse für unsere Zukunft Mummies: Man, Medicine, Magic Current research for our future.
Universität Zürich, Zürich, Schweiz, 2011. ISBN 978-3-033-03121-0.

Schoch T, Staub K.

Statistik – Die amtliche Statistik in der Schweiz.
Historisches Lexikon der Schweiz HLS, <http://www.hls-dhs-dss.ch/textes/d/D13798-1-2.php>, 2011.

Staub K.

Der biologische Lebensstandard im Kanton Bern seit 1800.
In: Martig P et al. (editors). Berns moderne Zeit. Das 19. und 20. Jahrhundert neu entdeckt. Stämpfli Verlag. 2011, S. 143.

Wanek J, Papageorgopoulou C, Rühli F.

Book Chapter 18, Fundamentals of Paleomaging Techniques: Bridging the Gap between Physicists and Paleopathologists, A Companion to Paleopathology (Blackwell Companions to Anthropology)
Anne L. Grauer (Editor), 2011, pp. 324-338.

8.4 Editorships

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

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

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

Associate Editor International Journal of Paleopathology (PD Frank Rühli)

Associate Editor Yearbook of Mummy Studies (PD Frank Rühli)

9 Other activities



Some ZEM members at the annual ZEM snow day, January 2011

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

Kinderuniversität Zürich

Dr Karl Link and PD Frank Rühli offered a lab course to school children age 10-12 about mummies and mummy research

Scientifica

Various members of the ZEM participated at the large science exhibition of the UZH



KD Thomas Böni at the ZEM booth of the Scientifica, August 2011

Academic teaching activities (UZH and external):

PD Frank Rühli

Clinical Anatomy (lectures and courses) 1st and 2nd year Medicine (Medical Faculty)

Paleopathology (general course, Medical Faculty)

Biomedical Imaging (Science Faculty)

Dr Karl Link

Clinical Anatomy (courses) 2nd year Medicine (Medical Faculty)

Histology 2nd year Medicine (Medical Faculty)

Dr Natallia Shved

Histology 2nd year Medicine (Medical Faculty)

Dr Kaspar Staub

Quantitative Methods in Economic History (Economics Faculty)

Dr Christina WarinnerHistology 2nd year Medicine (Medical Faculty)

Furthermore in cooperation with Prof Maciej Henneberg and Dr Arthur Saniotis at the University of Adelaide a **new senior level one-semester course (lectures and seminars) on Evolutionary Medicine** was established in 2011:

The anticipated knowledge, skills and attitude to be developed by the participant are:

1. Understanding of forces of evolution
2. Nexus between human evolution and culture
3. Psychological consequences of modern medical practices
4. Microevolutionary changes of humans in the recent history
5. Impact of social practices on forces of evolution (inbreeding, genetic load, gene flow)
6. Relationship between current medical practice & forces of evolution (mortality, fertility, mutations)
7. Ethical issues of evolutionary medicine and public health (avoidance of eugenic errors)
8. Physical development of humans and their socio-economic environment
9. Cultural diversity and health outcomes
10. Ability to analyze public health situations in evolutionary perspective.

For more information on this joint course in Adelaide, see: www.evolmed.com

International visits:

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

Prof. Dr Barry Bogin, Biological Anthropology, Loughborough University, Loughborough

Dr Enrico Cappellini, Centre for Geogenetics, University of Copenhagen, Copenhagen

Prof. Dr Matthew Collins, Department of Archaeology, University of York, York

Prof. Dr M Thomas P Gilbert, Centre for Geogenetics, University of Copenhagen, Copenhagen

Prof. Dr Maciej Henneberg, Department of Anatomical Sciences, Biological Anthropology and Comparative Anatomy Research Unit (BACARU), University of Adelaide, Adelaide

Prof. Dr Albert Zink, Institute for Mummies and the Iceman, EURAC, Bolzano

Academic mandates:**PD Frank Rühli**

Member Commission "Teaching", Medical Faculty UZH

President Gesellschaft für Anthropologie (German Society of Anthropology)
 Vice-President Swiss Society of Anthropology
 Expert for Professorship Appointments Israel Institute of Technology
 Expert for Professorship Appointments The Hebrew University of Jerusalem

Awards:

Dr Christina Warinner

TED (Technology, Entertainment and Design) Fellowship

Peer-reviewer for academic journals:

PD Frank Rühli

Current Biology
 Skeletal Radiology
 The Anatomical Record
 American Journal of Physical Anthropology
 Clinical Anatomy
 Evolution
 Antiquity
 International Journal of Osteoarcheology
 Journal of Egyptian Archeology
 Cretaceous Research
 Journal of Mediterranean Archaeology and Archaeometry

Dr Roger Seiler

Anthropologischer Anzeiger
 HOMO/Journal of Comparative Human Biology

Dr Kaspar Staub

Anthropologischer Anzeiger
 HOMO/Journal of Comparative Human Biology
 Journal of Biosocial Science

Dr Christina Warinner

Proceedings of the National Academy of Sciences, USA

Symposium

PD Frank Rühli

Program Organizer, 7th World Congress on Mummy Studies, San Diego, June 2011
 Scientific Review Committee, 2nd Bolzano Mummy congress: Mummies from the Ice. Bolzano, Italy, October 2011
 Chair, Lectures-Session IV: Ice Mummies – Radiology and CT-scanning, 2nd Bolzano Mummy congress: Mummies from the Ice. Bolzano, Italy, October 2011

Dr Christina Warinner

Session Co-Organizer and Chair, SAA Electronic Symposium, Current Methods in Paleoethnobotany, April 2011

10 Press reports



ZEM involvement in an excavation reported in Nature, November 2011

Print/Online reports about ZEM members / activities:

New Scientist, 15.1.2011
 Tagesanzeiger, 18.1.2011
 DiscoveryNews, 31.1.2011
 NZZ, 1.2.2011
 Nature, 3.2.2011
 DiscoveryNews, 4.2.2011
 Tages-Anzeiger Small Talk, 5.2.2011
 lière Radio-Canada, 6.2.2011
 ARTE TV, 12.2.2011
 Mercator News, März 2011
 Tagesanzeiger, 1.3.2011
 Discovery News, 1.3.2011
 Les Cahiers de Science & Vie, 1.3.2011
 PM History, 1.3.2011
 Handelszeitung, 3.3.2011
 News Scientist Life, 4.3.2011
 New Scientist, 19.3.2011
 Lokalinfo.ch, 1.4.2011
 Uni Kiel Newsletter, 2.4.2011
 ScienceNOW, 3.4.2011
 Neue Zürcher Zeitung, 4.5.2011
 The Advertiser (Australian Newspaper), 7.5.2011
 Berner Zeitung Online, 10.5.2011
 DiscoveryNews, 20.5.2011
 Discoverynews.com, 16.6.2011
 Msnbc.msn.com, 16.6.2011
 DiePresse.com, 16.6.2011
 News.Sciencemag.org, 16.6.2011
 ScienceNow, 18.6.2011
 Washington Post, 18.6.2011
 Io9.com, 20.6.2011
 ScienceNow, 20.6.2011
 Die Presse.com, 21.6.2011
 Ablogabouthistory.com, 22.6.2011
 Azadnegar.com, 22.6.2011
 Indianmirror.com, 22.6.2011
 Deutsche Welle.de, 27.6.2011
 Beobachter Natur, 1.8.2011
 Der Bund, 13.8.2011
 Tagesanzeiger, 13.8.2011
 Sciencenews.org, 23.8.2011
 Aargauer Zeitung, 29.8.2011
 Schweizer Illustrierte, 29.8.2011
 UZH Journal, September 2011
 Tagesanzeiger, 10.9.2011
 Der Bund, 14.9.2011
 L'Hebdo, 14.9.2011
 Tages-Anzeiger, 14.9.2011
 Der Bund, 16.9.2011
 New Scientist, 16.9.2011
 Tages-Anzeiger, 16.9.2011
 Der Bund, 20.9.2011
 SDA / Schweizerische Depeschagentur, 22.9.2011
 20 Minuten Zürich, 23.9.2011
 Aargauer Zeitung, 23.9.2011
 Blick, 23.9.2011
 Der Bund, 23.9.2011
 Der Landbote, 23.9.2011
 Die Südostschweiz, 23.9.2011
 Le Temps, 23.9.2011
 Neue Zürcher Zeitung, 23.9.2011

Press reports

Tages-Anzeiger, 23.9.2011
 Zürcher Oberländer, 23.9.2011
 Zürcher Unterländer, 23.9.2011
 Zürichsee-Zeitung / Bezirk Meilen, 23.9.2011
 Der Sonntag, 25.9.2011
 Sonntags Blick Magazin, 25.9.2011
 Tagesanzeiger, 30.9.2011
 WZ, 1.10.2011
 Ars Medici, 1.10.2011
 20 Minuten Online, 2.10.2011
 Beobachter Natur, 7.10.2011
 Medical Tribune, 7.10.2011
 NewScientist, 11.10.2011
 University of Adelaide Alumni Magazine: Lumen, November 2011
 Schweizer Familie, 3.11.2011
 Züri Tipp, 9.11.2011
 Süddeutsche Zeitung, 12.11.2011
 Nature, 24.11.11
 UZH Journal, Dezember 2011
 Der Bund, 1.12.2011
 Swissinfo.ch, 2.12.2011
 Le Nouvelliste, 9.12.2011



New Scientist cover story on ZEM research, March 2011

TV reports:

Discovery Channel Canada – Daily Planet, „Mummy Pathologist“ (PD Frank Rühli, Dr Roger Seiler)
 SF Schweizer Fernsehen, Einstein, „Die Mumie aus der Barfüsserkirche“, 15.9.2011 (PD Frank Rühli)
 SF Schweizer Fernsehen, PULS, Pulsmix, „Schweizer Männer werden immer grösser“, 19.9.2011 (PD Frank Rühli, Dr Kaspar Staub)
 TeleZüri, „Mumien-Ausstellung an der Universität Zürich“, 22.09.2011 (PD Frank Rühli)
 Swedish Television - Vetenskapens värld, 21.10.2011 (PD Frank Rühli, Dr Roger Seiler, Dr Lena Öhrström, Dr Kaspar Staub, Dr Christina Warinner)
 BBC TV series, Human Evolution "Prehistoric Autopsy" Interview, 22.12.2011 (Dr Martin Häusler)

Public mummy exhibition documentaries:

ZEM Mummy Exhibition, Ancient DNA Film (Dr Christina Warinner, Gül Akgül, Dr Natallia Shved)
 ZEM Mummy Exhibition, Mummy Research Film (PD Frank Rühli, Dr Christina Warinner, Dr Lena Öhrström, Dr Karl Link, Johann Wanek, Dr Roger Seiler)

Radio reports:

World Radio Switzerland Interview „Growth of Swiss conscripts“, 18.8.2011 (PD Frank Rühli, Dr Kaspar Staub)
 SR DRS 4 News „Schon die alten Ägypter hatten verkalkte Arterien“, 23.9.2011
 SR DRS 1 „Mumienausstellung an der Universität Zürich“, 24.9.2011
 DRS 2, Musik für einen Gast „PD Frank J. Rühli – Mediziner und Mumienforscher“ 12.11.2011
 Radio Berner Oberland Interview „Growth in Canton Bern since the 19th century“ 25.12.2011 (Dr Kaspar Staub)

11 Financial Support

Medienmitteilung vom 22.09.2011

«Mumien: Mensch, Medizin, Magie»: Von Ötzi Knochenstück bis zur ägyptischen Mumie

Die Universität Zürich zeigt auf dem Campus Irchel eine umfassende Mumien-Ausstellung. Sie präsentiert unterschiedliche Arten von Mumien und erklärt anschaulich die moderne Mumienforschung. Die Ausstellung vermittelt aber auch den faszinierenden Totenkult im alten Ägypten und die Magie, die von Mumien ausgeht. «Mumien: Mensch, Medizin, Magie» dauert vom 23. September 2011 bis 8. Januar 2012.

Die Ausstellung gibt einen Einblick in die Welt der Mumien und die neuesten Techniken, mit denen Mumien heute an der UZH medizinisch erforscht werden. Herzstück der Ausstellung ist eine begehbare ovale Mumienkapsel. Darin aufgebahrt sind die Mumie des ägyptischen Priesters Nes-Schu, eine peruanische Hockermumie, die Basler Barfüssermumie, eine Römermumie aus Ägypten, ein mittelalterliches Kinderhirn und ein Knochenstück von «Ötzi». An diesen und anderen Mumien erforschen Privatzoozent Frank Rühli und sein Team am Zentrum für Evolutionäre Medizin Todesursachen und diagnostizieren Krankheitsbilder. Ihr Ziel ist es, mehr zu erfahren über die Veränderungen und Neuentstehungen von Krankheiten über die Jahrhunderte hinweg. So gelangen sie zu neuen Erkenntnissen über Krankheits- und Gesundheitsprozesse in Vergangenheit, Gegenwart und Zukunft.

Downloads

(mp4, 16586 KB)
(Bild: UZH)

(jpg, 628 KB)
Frank Rühli (rechts) und Hendrik von Waldburg mit peruanischer Hockermumie vor einem MRI-Gerät. (Bild: Siemens-Pressbild)

(jpg, 272 KB)
Computertomographie-Scan der peruanischen Hockermumie. (Bild: UZH)



The public mummy exhibition – a major budgetary item, official UZH press release, September 2011

We are most thankful to the enormous support by

the Mäxi Foundation

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

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

Deutsche Forschungsgemeinschaft (DFG) (co-applicant: PD Frank Rühli)

ZHIP cooperative research grant (co-applicant PD Frank Rühli)

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

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

During 2011 **the following grants have been successfully acquired** by ZEM people:

Swiss National Science Foundation:

Micro-CT scanner for in-vivo imaging

CHF 188'000.-; co-applicant: PD Frank Rühli

Novartis Foundation for Biological and Medical Research:

aDNA Origin of HIV Resistance Allele

CHF 45'000.-; PD Frank Rühli, co-applicants: Dr Tina Warinner, Dr Abigail Bouwmann

Swiss Foundation for Nutrition Research:

aDNA Evolution of Swiss Diet

CHF 10'000.-, Dr Tina Warinner, co-applicants: PD Frank Rühli, Dr Natallia Shved, Dr Abigail Bouwmann

Highly appreciated **funding for the 2011 public mummy exhibition** has been given to PD Frank Rühli by the following funding bodies:

Mercator Foundation Switzerland

Mäxi Foundation

Göhner Foundation

G+B Schwyzer Foundation

Swiss National Science Foundation

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Medical Faculty University of Zurich

Science Faculty University of Zurich

Cogito Foundation

Siemens Healthcare Systems Germany

12 ZEM Goals 2012



The ZEM journey has just started ...

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

- **Finish pilot studies / continue major research projects**
- **Get more rooms (e.g. ancient DNA lab space)**
- **New research staff appointments (esp. for imaging group)**
- **Acquire additional external funding**
- **Update organisational structure (internal regulations, ZEM grants, restructure advisory board etc.)**

Impressum:

PD Frank Rühli
 Dr Karl Link
 Bettina Kreissl Lonfat

Zurich, April 2012

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

www.evolutionarymedicine.ch

You may also follow us on Facebook and Twitter.



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