



IEMNews



Dr. Abigail Bouwman presenting at an ancient DNA workshop

Teaching Evolutionary Medicine (Dr. Martin Häusler, Head a.i. Morphology/Imaging Group)

Evolutionary medicine has been proposed as a key organizing principle of medical education. Therefore, the application of modern evolutionary theory to the investigation of human health and disease has the potential capacity to bring diverse medical disciplines together and weave them into a coherent explanatory narrative. Moreover, the incorporation of the principles of human evolution and its forces in the strategy of future medical practitioners is needed, since an understanding of the evolutionary dynamics of the human body will allow optimization of medical therapies and public health policies.

Teaching is therefore a core mission of the IEM. As one of the first institutions of its kind worldwide, the IEM introduced in the spring semester of 2014 an elective course in evolutionary medicine for medical undergraduate students, which is offered every semester. The module consists of seven half days (four hours each) and includes lectu-

res and practical sessions. In addition, the IEM offers a 3.5 week block course addressed at Bachelor of Science students. This course was introduced in the fall semester of 2013 along with a spring lecture series on advanced topics in evolutionary medicine. Both modules were originally offered in a one-year rotation. In response to the high demand, the lecture series has now been upgraded to a second block course starting in spring semester 2016.

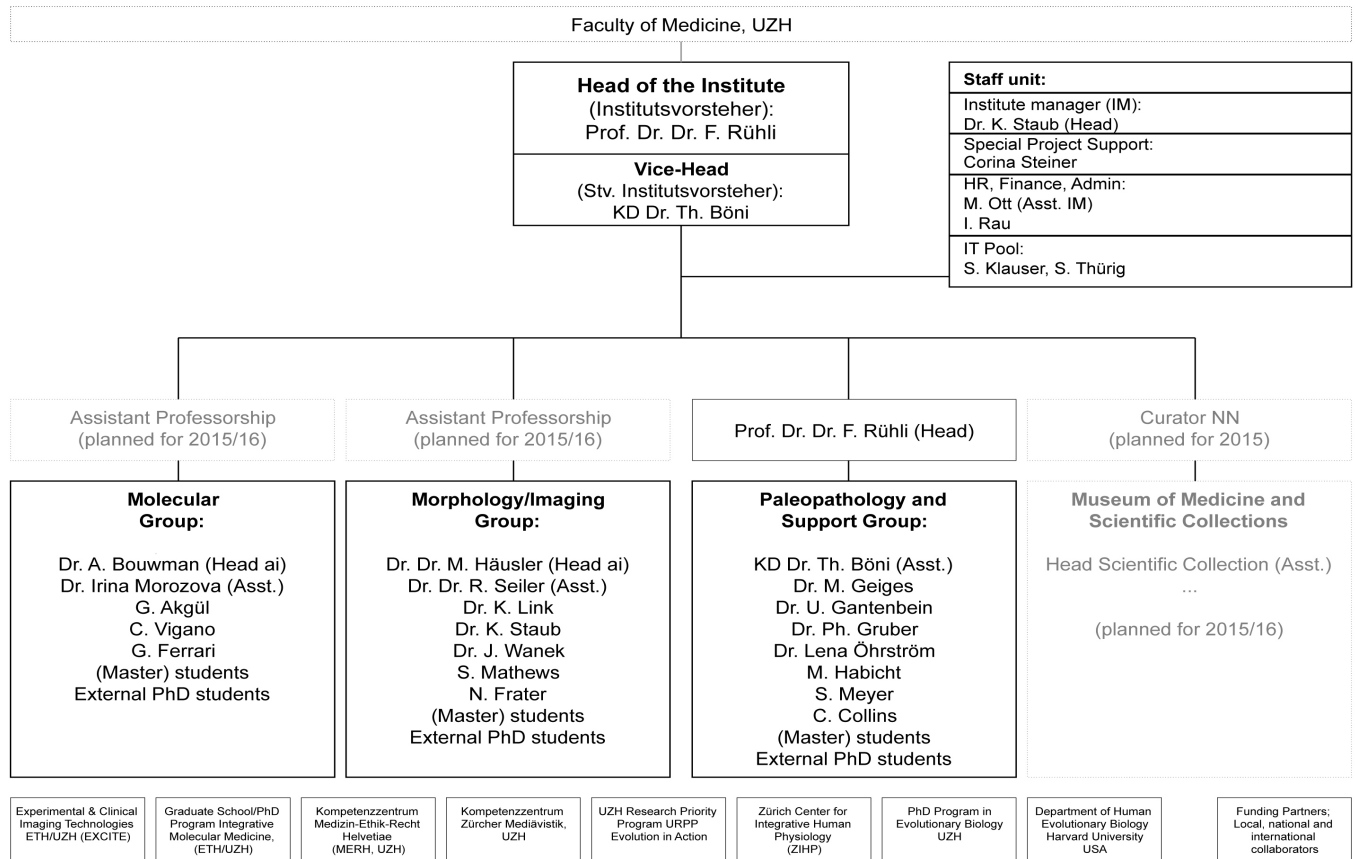
The main aims of the courses are to (1) explain modern evolutionary theory and its bearing on the evolution of human health and diseases; (2) discuss the evolutionary origins of humans and the evolutionary pressures acting upon them under ancestral conditions; (3) examine the macro-evolutionary origin of musculoskeletal disorders as possible trade-offs to the evolution of bipedal locomotion; (4) analyse micro-evolutionary changes of human anatomy and

physiology in the last few centuries; (5) summarize state-of-the-art research in the field of ancient DNA; (6) address ethical issues regarding the use of ancient remains.

The most recent student assessment showed an excellent overall quality of the courses, 62% of the students being very satisfied, and 38% being satisfied. They particularly liked working with ancient human remains, and also enjoyed the broad range of research topics covered, which makes the course very diverse and interesting. Importantly, they judged that the course stimulates critical thinking. We therefore expect that future practitioners of health-related professions can apply these principles of human evolution and its forces in their work. It is hoped that an understanding of the evolutionary dynamics of the human body will enable them to optimize medical therapies and public health policies.

IEM Organigram

Institute of Evolutionary Medicine (IEM) (as of April 2015)



Vision and Mission Statement

We are a leading international and globally connected research, teaching and service institute which is part of the medical faculty at the University of Zurich. We analyse ancient biological material and associated data to better understand modern human health issues and diseases. Due to specialist scientific expertise, excellent infrastructure and state-of-the-art methodologies, we are able to work on various interdisciplinary research questions in the context of the field of Evolutionary Medicine. Our core competencies include:

- In the area of morphology: Clinical Anatomy; Variability and adaptation of body morphology as a function of time (Microevolution), sex, robustness,

time (Microevolution), socio-economic factors (etc.); Macroevolution of joint pathologies.

- In the area of imaging: application of modern imaging techniques (MRI, terahertz) on historical tissues; Radiological diagnosis of pathologies.

- In the area of ancient DNA: Co-evolution of diseases and the human genome (evolution of human pathogens, microbiome analyses etc.); Service for Archaeology/Historical Anthropology (paternity testing, sex determination).

- Maintaining a novel medical museum for the public and a medical history object collection for the scientific communi-

ty (from 2016).

- Ethical considerations for research on historical human tissues.

We will increase the recognition of the research field of Evolutionary Medicine and expand academic teaching of the subject within and outside the Faculty of Medicine. This will be of a sustainable value for our stakeholders at the University of Zurich, in the research community of evolutionary medicine and adjacent areas, to the economy and ultimately for society in general.

Words from a Local Collaborator



Nicole Bender
MD, PhD, MSc, FMH
Institute of Social and Preventive
Medicine (ISPM), University of Bern

When I started my research group in Evolutionary Medicine at the Institute of Social and Preventive Medicine at the University of Bern in 2007, I was the only dedicated researcher in this field in Switzerland. I was therefore very excited when I heard about the ZEM in 2010 and I immediately established contact with Frank Rühli. I was invited to give a talk at the ZEM to present my work and interests.

Since this time we regularly kept in touch, and from last year we have been cooperating on the organization of the Evolutionary Medicine Conference: Interdisciplinary Perspectives on Human Health and Disease, to be held on July 30 – August 1 2015 at the Institute of Evolutionary Medicine (IEM), University of Zürich. During this year we had many meetings, not only to discuss the conference, but also to discuss research projects, new ideas, future directions of the field, etc. This year of intensive exchange was very inspiring to me, as finally I found colleagues with similar interests in Switzerland.

I met many staff members of the IEM on several occasions during the last year and I was impressed by the pleasant combination of highly specialised professional competence and warm interpersonal relationships at this institute. My collaboration with the IEM is developing further, I started to participate in teaching activities of the IEM in Zürich, and I was invited by Kaspar Staub to participate in a research project on height and BMI in Swiss conscripts. As my field of interest is the evolution of human body composition, this collaboration fits very nicely my own research agenda, and we have already started to think about future common projects. The IEM is young and vividly developing and expanding. I follow this development with interest and I am looking forward to further deepen my collaboration with the IEM.

A message from the Directorate of the Institute

Dear Ladies and Gentlemen

The founding of the Institute of Evolutionary Medicine occurred a few months ago. We had a smooth transition and in the meantime we also took over some more responsibilities in the form of to be re-launched Museum of Medicine. The administrative groundwork for a continuous efficient environment within these new exciting structures has been laid and the whole team looks forward to expanding the various projects. As one upcoming highlight the first ever of its kind conference on Evolutionary Medicine in Europe, which will be hosted by us this summer. The aim of this conference is to bring scholars of all professional backgrounds together to address interdisciplinary perspectives on human health and disease, the core goal of our research and teaching. The latter we are also continuously expanding, we now offer more courses and modules than ever and get excellent reviews by participating students. We would like to use this opportunity to thank the whole team who supports us in this new, even more responsible position. Enjoy reading this newsletter and if you have any question please feel free to contact us any time, we look forward to being in touch with you.

Yours sincerely

Frank Rühli and Thomas Böni

Photo: Staff Excursion to South Tyrol (June 2015)



IEM-Publications (Selected publications since last IEM News 7/2014)

Habicht ME, Henneberg M, Öhrström LM, Staub K, Rühli FJ (2015). Body height of mummified pharaohs supports historical suggestions of sibling marriages. *American Journal of Physical Anthropology*, 157(3):519-25.

Gelderman MP, Baek JH, Yalamanoglu A, Puglia M, Vallelian F, Burl B, Vostal J, Schaer DJ (2015). Reversal of hemochromatosis by apo-transferrin in non-transfused and transfused Hbbth3/+ (heterozygous b1/ b2 globin gene deletion) mice. *Haematologica*, 100(5):611-622.

Gascho D, Rühli FJ, Meyer S, Martinez RM, Thali MJ (2015). Life is like a box of chocolates – you never know what you're gonna get! ...And sometimes things go missing. *Journal of Forensic Radiology and Imaging*, in press.

Kreissl Lonfat BM, Kaufmann IM, Rühli FJ (2015). A code of ethics for evidence-based research with ancient human remains. *Anatomical Record*, 298(6):1175-81.

Lindsay KE, Rühli FJ, Deleon VB (2015). Revealing the face of an ancient Egyptian: synthesis of current and traditional approaches to evidence-based facial approximation. *Anatomical Record*, 298(6):1144-61.

Lynnerup N, Rühli FJ (2015). Short Review: The Use of Conventional X-rays in Mummy Studies. *Anatomical Record*, 298(6):1085-7.

Meyer S, Boschetti A, Hauri R, Rühli FJ, Böni T (2014). A trepanned skull from the 19th century AD found in Steinhausen, Switzerland. *Bulletin der Schweizerischen Gesellschaft für Anthropologie*, 20(1):27-33.

Monge JM, Rühli FJ (2015). The anatomy of the mummy: mortui viventes docent-when ancient mummies speak to modern doctors. *Anatomical Record*, 298(6):935-40.

Özen AC, Ludwig U, Öhrström LM, Rühli FJ, Bock M (2015). Comparison of ultrashort echo time sequences for MRI of an ancient mummified human hand. *Magnetic Resonance in Medicine*, in press.

Öhrström LM, Seiler R, Böni T, Aali A, Stöllner T, Rühli FJ (2015). Radiological findings in an ancient Iranian salt mummy (Chehrābād ca. 410-350 BC). *Skeletal Radiology*, 44(6):811-21.

Öhrström LM, Fischer BM, Bitzer A, Wallauer J, Walther M, Rühli FJ (2015). Terahertz imaging modalities of ancient Egyptian mummified objects and of a naturally mummified rat. *Anatomical Record*, 298(6):1135-43.

Papageorgopoulou C, Link K, Rühli FJ (2015). Histology of a woolly mammoth (*Mammuthus primigenius*) preserved in Permarost, Yamal Peninsula, Northwest Siberia. *Anatomical Record*, 298(6):1059-1071.

Papageorgopoulou C, Shved N, Wanek J, Rühli FJ (2015). Modeling ancient Egyptian mummification on fresh human tissue: macroscopic and histological aspects. *Anatomical Record*, 298(6):974-87.

Rühli FJ (2015). Short review: magnetic resonance imaging of ancient mummies. *Anatomical Record*, 298(6):1111-5.

Rühli FJ, Habicht M (2014). Sanitätsdienst bei den alten Ägypten - in der Antike. *Swiss Review of Military and Disaster Medicine*, 2:26-29.

Rühli FJ, Ikram S, Bickel S (2015). New Ancient Egyptian human mummies from the Valley of the Kings, Luxor: Anthropological, radiological and Egyptological investigations. *Biomed Research International*, ID 530362.

Seiler R, Rühli FJ (2015). The opening of the mouth»-a new perspective for an ancient Egyptian mummification procedure. *Anatomical Record*, 298(6):1208-16.

Sydler C, Öhrström L, Rosendahl W, Woitek U, Rühli FJ (2015). CT-Based Assessment of Relative Soft-Tissue Alteration in Different Types of Ancient Mummies. *Anatomical Record*, 298(6):1162-74.

Vallelian F, Deuel JW, Opitz L, Schaer CA, Puglia M, Lönn M, Engelsberger W, Schauer S, Karnaukhova E, Spahn DR, Stocker R, Buehler PW, Schaer DJ (2015). Proteasome inhibition and oxidative reactions disrupt cellular homeostasis during heme stress. *Cell Death and Differentiation*, 22(4):597-611.

Van Schaik K, Rühli FJ (2015). Evolution of prevention: Epidemiological transitions, evolutionary medicine, and clinical practice. *Preventive Medicine*, 73:117-8.

Upcoming dates with IEM participation

- July 30 - August 1, 2015: Evolutionary Medicine Conference 2015, organized by the IEM, University of Zürich, Irchel, Switzerland.
- August 23-30, 2015: International Congress of Egyptologists XI, Florence, Italy.
- September 4, 2015: GFA Congress, Lausanne, Switzerland

New Members of the Institute

The IEM is happy to welcome the following members to the institute:

- Dr. Irina Morozova (Postdoc Research Assistant, Molecular Group)
- M.A. Corina Steiner (Special Project Support)
- Dr. Rouven Turck (Associate Paleopathology Group)

Selected IEM media and press reports

Print/Online:

- Die Zeit Wissen, January 2015
- Dailymail, 26 January 2015
- Discover, January/February 2015
- Bild der Wissenschaft, Nr 6 2015
- Deutschlandfunk, 10 March 2015
- Tagesanzeiger, 1 April 2015
- Nature, 7 May 2015
- The Cairo Post, 14 May 2015
- Selket.de, 16 May 2015
- CBSNEWS, 26 May 2015
- Ancient online, 31 May 2015

Television:

- WRD, planet wissen, 23 June 2015

Editorial:

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<http://www.swissmummyproject.uzh.ch>
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