

# PROGRAM AND ABSTRACTS

GfA 10th international meeting

BIOLOGICAL ANTHROPOLOGY: PROSPECTS AND PERSPECTIVES

PERSPEKTIVEN DER ANTHROPOLOGIE

September 2nd - 6th 2013

EURAC research

Viale Druso 1

Bolzano, I-39100

INSTITUTE FOR MUMMIES AND THE ICEMAN/INSTITUT FÜR MUMIEN UND DEN ICEMAN/ISTITUTO PER LE MUMMIE E L'ICEMAN

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## Scientific Review Committee

President (Chair):

Albert R. Zink

Members:

Manuela Dittmar  
Birgit Großkopf  
Eilin Jopp  
Bettina Jungklaus  
George McGlynn  
Christiane Scheffler  
Martin Trautmann

## Invited Speakers

Barry Bogin  
Centre for Global Health & Human Development, School of Sport Exercise & Health Sciences,  
Loughborough University, UK  
Ellen Dissanayake  
School of Music, University of Washington Seattle, USA  
Carme Rissech  
Faculty of Biology, University of Barcelona, Spain  
Janina Tutkuvienė  
Faculty of Medicine, Vilnius University Lithuania  
Douglas Ubelaker  
National Museum of Natural History, Smithsonian Institution, Washington USA  
Franz M. Wuketits  
Institut für Philosophie, Universität Wien NIG, Austria

## Local Organizing Committee

EURAC- Institute for mummies and the Iceman Staff Members  
EURAC-Convention Center

# PROGRAM OVERVIEW

## Monday, September 2nd, 2013

14.00 - 18.00 Registration, EURAC main building  
19.00 Informal get together,  
Batzenhäusl - Ca' de Bezzi - Via Andreas Hofer Str. 30

## Tuesday, September 3rd, 2013. EURAC auditorium

08.00-09.00 Registration - Poster set up  
09.00-09.30 Congress Opening  
09.30-10.30 Session 1 - Physical Anthropology  
10.30-11.00 Coffee Break  
11.00-12.30 Session 2 - Physical Anthropology  
11.00-12.00 Invited speaker: Douglas Ubelaker  
12.30-14.00 Lunch  
14.00-15.30 Session 3 - Anthropology and Prevention  
14.00-15.00 Invited speaker: Barry Bogin  
15.30-16.00 Coffee Break  
16.00-17.00 Session 4 - Anthropology and Prevention  
  
18.30 Visit to the "Ötzi-Exhibition", South Tyrolean Museum of Archaeology

## Wednesday, September 4th, 2013. EURAC auditorium

09.00-10.30 Session 5 - Archaeometry  
10.30-11.00 Coffee Break  
11.00-12.30 Session 6 - Archaeometry  
12.30-13.30 Lunch  
13.30-15.00 Poster Session  
15.00-15.30 Coffee Break  
15.30-17.30 Session 7 - Forensic Anthropology  
15.30-16.30 Invited Speaker: Carme Rissech  
  
18.00 GfA member general assembly meeting

Thursday, September 5<sup>th</sup>, 2013. EURAC auditorium

09.00-10.45	Session 8 - Anthropology and Gender studies
09.00-10.00	Invited speaker Janina Tutkuvieniė
10.45-11.15	Coffee Break
11.15-12.30	Session 9 - Panel: Ethology of the Arts
12.30-14.00	Lunch
14.00-15.30	Session 9 - Human Ethology
14.00-15.00	Invited speaker Ellen Dissanayake
15.30-16.00	Coffee Break
16.00-17.30	Session 10 - Anthropology and Pedagogics
16.00-17.00	Invited speaker Franz Wuketits
17.45	Departure for Conference Dinner

Friday, September 6<sup>th</sup>, 2013. EURAC auditorium

09.00-11.00	Session 11 - Physical Anthropology
11.00-11.30	Coffee Break
11.30-12.30	Session 12 - Mummy Studies
12.30-13.00	Award Ceremony, Closure of Conference

Saturday, September 7<sup>th</sup>, 2013

06.00	Day trip departure to the Iceman find spot, Bus stop - opposite EURAC main entrance
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Please Note:

GfA work groups will have their meetings during lunch breaks.

## SCIENTIFIC PROGRAM

Tuesday, September 3 <sup>rd</sup> , 2013. EURAC auditorium	
08.00-09.00	Registration - Poster set up
09.00-09.30	Opening Ceremony Welcome Address: <i>EURAC Head Office</i> Congress Opening: <i>Albert Zink</i>
Session 1 - Physical Anthropology	Chair: G. McGlynn
09.30 - 09.45	A01 <i>Flohr, S.</i> : Geometrical properties of leg bones of human remains from two different archaeological sites in Germany.
09.45-10.00	A02 <i>Lösch, S., Campana, L., Ramstein, M.</i> : Excavation of a Neolithic Dolmen in Switzerland
10.00-10.15	A03 <i>Bergmann, I., Wahl, J., Harvati, K.</i> : The temporal bias of sexual dimorphism in mandibular morphology of Central European Homo sapiens
10.15-10.30	A04 <i>von Heyking, K., Harbeck, M., McGlynn, G., Grupe, G.</i> : Study results from the medieval poorhouse cemetery at Minoritenweg, in Regensburg
10.30-11.00	Coffee Break
Session 2 - Physical Anthropology	Chair: J. Wahl
11.00-12.00	L01 Invited lecture: <i>Douglas H. Ubelaker</i> Trauma Analysis: Lessons from Modern Forensic Cases
12:00-12:15	A05 <i>Carlinchi, N., McGlynn, G., Zanesco, A., Seifert, O., Haring, C.</i> : Violence or Accident? Traumatic injuries in the skeletal remains from the Psychiatric Hospital, Hall in Tirol
12.15-12.30	A06 <i>Molnár, E., Merczi, M., Marcsik, A. Bernert, Z., Józsa, L., Buczkó, K. Zádori, P., Vandulek, C., Bíró, G., Hajdu, T.</i> : Skeletal metastatic carcinomas from Hungary (1st-5th centuries AD)

12.30-14.00		Lunch break
Session 3 - Anthropology and Prevention		Chair: M. Hermanussen
14.00-15.00	L02	Invited lecture: <i>Barry Bogin</i> Globalization and children's diets: The case of the Maya of Mexico as the blueprint for translational research'
15.00-15.15	A07	<i>Scheffler, C., Rietsch, K.</i> : Physical activity explains decreased skeleton breadth measurements in children today.
15.15-15.30	A08	<i>Kromeyer-Hauschild, K.</i> : Overweight and obesity defined by body mass index and waist circumference in children and adolescents from Thuringia
15.30-16.00		Coffee Break
Session 4 - Anthropology and Prevention		Chair: Ch. Scheffler
16.00-16.15	A09	<i>Lehmann, A. Rühli, F., Woitek, U., Staub, K.</i> : From growth in height to growth in breadth" - The change in body dimensions among German conscripts and its impact for epidemiological research
16.15-16.30	A10	<i>Dittmar M., Olbrich, D., Leick, P., Dalgård, C., Ohm Kyvik, K.</i> : Poor sleep quality is associated with higher cortisol increase after awakening and CLOCK gene polymorphisms in the Danish general population
16.30-16.45	A11	<i>Mumm, R., Hermanussen, M., Scheffler, C.</i> : New references of BMI - percentiles of girls related to age of menarche
16.45-17.00	A12	<i>Schneider, A., Collatz, K.-G.</i> : The inside-view of the body - from antiquity until today
18.30		Visit to the "Ötzi-Exhibition" at the South Tyrolean Museum of Archaeology

Wednesday, September 4<sup>th</sup>, 2013. EURAC auditorium

Session 5 - Archaeometry		Chair: B. Großkopf
09.00 - 09.15	A13	<i>Krause, J.</i> : Ancient Pathogen Genomics: What we learn about the evolution of infectious disease

09.15-09.30	A14	<i>Maixner, F., Kim, M.-R., Coia, V., Wahl, J., Zink, A.:</i> The Alemannic graves from Niederstotzingen in Baden-Württemberg, Germany - Molecular sex determination and mitochondrial haplogroup designation of the human skeletal remains
09.30-09.45	A15	<i>Krause-Kyora, B., Hemmrich-Stanisak, G., Maixner, F., Zink, A., Franke, A., Nebel, A.</i> Revisiting the Iceman genome
09.45-10.00	A16	<i>Coia, V., Capocasa, M., Anagnostou, P., Scarnicci, F., Boschi, I., Battaglia, C., Crivellaro, F., Ferri, G., Alu, M., Brisighelli, F., Capelli, C., Maixner, F., Cipollini, G., Zink, A. Destro Bisol, G.:</i> Genes, mountains and cultures: high genetic diversity among and within ethno-linguistic groups in the Alps
10.00-10.15	A17	<i>Pósa, A., Mende, B.G., Köhler, K., Maixner, F., Zink, A., Molnár, E., Bereczki, Z., Perrin, P., Sola, C., Pálfi, G.:</i> Late-Neolithic human samples used for TB paleomicrobial research
10.15-10.30	A18	<i>Schuenemann, V., Singh, P., Krause-Kyora, B., Cole, S., Nieselt, K., Krause, J.:</i> The history of leprosy from genome-wide comparison of medieval and modern <i>Mycobacterium leprae</i>
10.30-11.00		Coffee Break
Session 6 - Archaeometry		Chair: G. Grupe
11.00-11.15	A19	<i>Bonazzi, M., Le Cabec, A., Schünemann, V., Harvati, K., Hublin, J.-J., Tafforeau, P., Krause, J.:</i> Insights into the influence of computed tomography on ancient DNA recovery
11.15-11.30	A20	<i>De Angelis, F., Carboni, L., Cianfanelli, A., Di Giannantonio, S., Martinez-Labarga, C., Scorrano, G., Brilli, M., Rickards, O., Catalano, P.:</i> Life before death in an imperial age society (Rome, 1st-3rd Century AD): The bioarchaeological answers
11.30-11.45	A21	<i>Grigat, A., Grupe, G.:</i> The St. Pankratius Churchyard in Altdorf/Düren - results of the morphological and archaeometric investigations of an 18th-20th century rural population
11.45-12.00	A22	<i>Moghaddam, N., Kanz, F., Grosschmidt, K., Risser, D.U., Lösch, S.:</i> Stable isotope analysis of human bones from Roman Ephesus (Turkey, 2nd and 3rd ct. AD).
12.00-12.15	A23	<i>Held, P., Alt, K.W.:</i> Weaning in Medieval and Early Modern Times
12.15-12.30	A24	<i>Wycisk, D., Grupe, G.:</i> Determining the origin of Imperial domestic animals from Ickern, Castrop-Rauxel -- Quantification using 87Sr/86Sr isotope

		analysis
12.30-13.30		Lunch break
13.30-15.00	P	Poster Presentation
15.00-15.30		Coffee break
Session 7 - Forensic Anthropology		Chair: U. Wittwer
15.30-16.30	L03	Invited lecture: <i>Carrie Rissech</i> Methods for adult and sub-adult age estimation based on documented human skeletal remains from Western Europe. Application in Osteoarchaeology and Forensic Anthropology
16.30-16.45	A25	<i>Hoke, N., Rott, A., Kaliwoda, M., Reul, A., Beck, A., Fehr, K.T., Grupe, G., Harbeck, M.</i> : Cemetery Munich West: Early diagenetic alterations of the organic and inorganic bone matrix after short inhumation times
16.45-17.00	A26	<i>Witzel, C.</i> : Relating the duration of developmental periods to increment counts in enamel formed prior to and after birth
17.00-17.15	A27	<i>Neuberger, F., Gruber, S.</i> : Hair strands as a diet record - New insights in forensic and archaeological hair analysis
17.15-17.30	A28	<i>Anders, S., Holley, S., Grupe, G., Graw, M.</i> : Thermographical detection of forearm vein patterns for identification
18.00		Mitgliederversammlung der GfA - GfA members general assembly meeting

Thursday, September 5<sup>th</sup>, 2013. EURAC auditorium

Session 8 - Anthropology and Gender studies		Chair: M. Dittmar
09.00 - 10.00	L04	Invited lecture: <i>Janina Tutkuvienė</i> Worldwide variation of menarcheal age in relation to environmental and socio-economic indicators: interface between global, regional and indigenous factors.

10.00-10.15	A29	<i>Lehmann, A., Hermanussen, M., Scheffler, C.:</i> Social Amenorrhea - a new aspect of human maturation?
10.15-10.30	A30	<i>Kirchengast, S.:</i> Reproductive senescence -a gender perspective
10.30-10.45	A31	<i>Zsakai, A., Bodzsar, E.</i> The relationship between menopausal status and body structure
10.45-11.15		Coffee Break
Session 9 - Panel - Ethology of the Arts 11.15-12.30	A32	<i>Sütterlin, Ch., Schiefenhövel, W., Lehmann, Ch. Forster, J., Apfelauer, G.,</i> Art as behaviour - towards an ethology of the arts
12.30-14.00		Lunch break
Session 9 Human Ethology		Chair: W. Schiefenhövel
14.00-15.00	L05	Invited lecture: <i>Ellen Dissanayake</i> What cupules suggest about early human symbolic capacity and the beginning of art
15.00-15.15	A33	<i>Vanhaeren, M., Schiefenhövel, W.:</i> Beads and Beauty. On the Prehistory and Human Ethology of Body Decoration
15.15-15.30	A34	<i>Wimmer, M.:</i> Symbolic order between nature and culture
15.30-16.00		Coffee Break
Session 10 - Anthropology and Pedagogics		Chair: Ch. Sütterlin
16.00-17.00	L06	Invited lecture: <i>F. M. Wuketits</i> Anthropology: Nature and Culture
17.00-17.15	A35	<i>Forster, J.:</i> Homo educabilis - anthropological contributions to the current discussion of education
17.15 -17.30	A36	<i>Tsioli, Z.;</i> Konstantinou, L. Evolution and selfunderstandig today
17.45		Departure for Conference Dinner

Friday, September 6<sup>th</sup>, 2013. EURAC auditorium

Session 11 - Physical Anthropology		Chair: I. Trautmann
09.00-09.15	A37	<i>Wittwer, U.</i> Recommendations for the Care of Human Remains in Museums and Collections
09.15-09.30	A38	<i>Konstantinou, L., Georgousopoulou, TH.:</i> The burial of a doctor in the ancient Acharnai/Hellas
09.30-09.45	A39	<i>Andreetta, A., Ebnöther, C., Marti, R., Ulrich-Bochsler, S., Lösch, S.:</i> Archaeology and Anthropology of southern Swiss alpine cemeteries from medieval times: Characterization of population and settlement between local ecology and transalpine mobility. Preliminary Results
09.45-10.00	A40	<i>Bereczki, Z., Mihácz-Pálfi, A., Molnár, E., Marcsik, A., Pálfi, G.:</i> Artificial cranial deformation among the Avar Age populations of Eastern Hungary
10.00-10.15	A41	<i>Zipp, K.:</i> Prone Burials in Roman Antiquity: Peculiar in life and in death?
10.15-10.30	A42	<i>Zäuner, S.:</i> News from the old chief - Grave 43 of the Varna necropolis revised
10.30-10.45	A43	<i>Paja, L., László, O.:</i> Traumatic alterations and their interpretation. Systematic anthropological analyses of the medieval osteoarchaeological material of Perkáta - Nyúli-dulo (Hungary)
10.45-11.00	A44	<i>Strouhal, E.:</i> Title to be announced
11.00-11.30		Coffee Break
Session 12 - Mummy Studies		Chair: B. Jungklaus
11.30-11.45	A45	<i>Elias, J.; Milani, C.; Bernardo, L.; Malgora, S.:</i> The Ankhpakhered Mummy Project: Endoscopy and Analysis
11.45-12.00	A46	<i>Paladin, A., Maixner, F., Reggiani, P., Sartori, P., Gostner, P., Nelson, J., Jones, C., Grimm, R., Nelson J.; Creig J.; Rosendahl, W., Zink, A.:</i> The Priestess of the Natural History Museum of Venice, Italy: an Egyptian mummy from the "Crocodile Grotto"
12.00-12.15	A47	<i>Alterauge, A., Schultz, M., Rosendahl, W., Schlothauer, A.:</i> Trophy heads and warrior belts - The contribution of physical anthropology to the history of the Mundurucu Indians of Brazil
12.15-12.30	A48	<i>Milani, C., Malgora, S., Zink, A., Elias, J., Pernter, P., Gobbi, E. Marzoli, C.:</i> The Meran Mummy: the old egyptian lady
12.30-13.00		Award Ceremony. Closure of Conference

## POSTER SESSION

- P01 *Grupe, Gisela; Kröger, Peer; Schmahl, Wolfgang ; Toncala, Anita* “Transalpine mobility and culture transfer”: Research Unit of the German Science Foundation (FOR 1670)
- P02 *Zaeuner, Steve; Wahl, Joachim; Bojadziev, Yavor Aslanis; Janis.* A 6000 Year Old Hand Amputation from Bulgaria
- P03 *Storch, Susanne; Dr. Biermann, Felix; Dr. Kersting, Thomas; Roskoschinsky, Philipp.* A Late-Slavic elite grave in Stolpe at river Oder/Germany
- P04 *Storch, Susanne; Bräunig, Rene.* A pauper cemetery at Schwedt on the Oder (Brandenburg/Germany)
- P05 *Olbrich, Denise; Leick, Puk Channa; Dalgård, Christine; Kyvik, Kirsten Ohm; Dittmar, Manuela.* Body Mass Index is related to sleep quality and clock gene variants
- P06 *Paladin, Alice; Maixner, Frank; Nicolis, Franco; Lanzinger, Michele; Pedrotti, Annalisa; Zink, Albert.* Comparative study of the Tyrolean Iceman and human remains from prehistoric Trentino-Alto Adige
- P07 *Delaconi, Paola; Mazzarello, Vittorio; Bandiera, Pasquale; Chessa, Daniela; Piu, Gabriella; Pomponi, Valeria; Serra, Rita Maria; Piga, Giorgio; Longoni, Federica; Giau, Claudia; Uras, Manuela, Kelvin, David J.; Kelvin, Nikki; Rubino, Salvatore.* Comparison of Sardinian and Peruvian mummies by histological, immunohistochemical and anthropological study
- P08 *Schütz, Daniel.* Detection of gene flow between Polynesian populations
- P09 *Trautmann, Bernd.* Health and Disease in the Medieval Rural Society of Grevenmacher (Luxembourg)
- P10 *Coia, Valentina; Cipollini, Giovanna; Maixner, Frank; Brisighelli, Francesca; Capelli, Cristian; Battaglia, Cinzia; Destro Bisol, Giovanni; Zink, Albert.* Insight into the relationship between modern populations and the Tyrolean Iceman
- P11 *Teßmann, Barbara; Möller, Daniel; Stoecker Holger; Schnalke, Thomas; Winkelmann, Andreas .* Interdisciplinary Provenance Research on Human Remains of the Colonial Period
- P12 *Schlager, Stefan; Rüdell, Alexandra.* Landmark free geometric analysis of the human zygomatic structure
- P13 *Rudzinski, Anna; Rüdell, Alexandra.* Model-based approaches to plant archaeogenetics
- P14 *Wiechmann, Ingrid; Grupe, Gisela; Özbasaran, Mihriban; Peters, Joris.* Molecular genetic analysis of Ovis remains excavated at Pre-Pottery Neolithic Asikli Höyük (Central Anatolia, Turkey)
- P15 *Jungklaus, Bettina.* Palaeopathological examination of children’s skulls from the late medieval population of the village Diepensee (Brandenburg)

P16 *Bodzsar, Eva; Utczas, Katinka; Zsakai, Annamaria*. Sexual maturation pattern in the mirror of socioeconomic background

P17 *Lang, Caroline; Kraft, Richard; Grupe, Gisela*. Strontium isotope analysis of mice bone extraceted from owl pellets: isotopic mapping of Bavaria based on biologically available strontium

P18 *Keller, Marcel; Rott, Andreas; Hoke, Nadja; Grupe, Gisela; Harbeck, Michaela; Wahl, Joachim*. *United in death - related by blood?* Genetic and archaeometric analyses of skeletal remains from the neolithic earthwork Bruchsal-Aue

P19 *Schirmer, Saskia Thérèse; Gaus, Sebastian; Exner, Stefan*. Walking the Black Dog: Should depressive patients travel?

P20 *Messina, Francesco; Finocchio, Andrea; De Angelis, Flavio; Rolfo, Mario Federico; Rapone, Cesare; Martínez-Labarga, Cristina; Coletta, Martina; Biondi, Gianfranco; Berti, Andrea; Comas, David; Rickards, Olga*. When genetics plays as historical tool: traces of forgotten events in mountain areas of Central Italy.

P21 *Vohberger, Marina*. Wildlife forensics: preservation of a possible capercaillie habitat

P22 *Immler, Franziska; Rott, Andreas; Grupe, Gisela; Harbeck, Michaela; Haas-Gebhard, Brigitte; Gärtner, Tobias*. Women and arms in the early medieval times: Morphological and molecular biological sex determination in archaeological/ anthropological diverging cases

P23 *Anagnostou, Paolo; Capocasa, Marco; Milia, Nicola; Sanna, Emanuele; Luzi, Daniela; Coia, Valentina; Destro Bisol, Giovanni*. Yes we can! data sharing close to 100% in ancient human DNA studies

P24 *Hollerbuhl, Tina; Dittmar, Manuela*. Young and older healthy women differ in their sleep timing and cortisol concentration after awakening, but not in their sleep structure

P25 *Grumer, Astrid; Maixner, Frank; Pichler, Barbara; Schroffenegger, Franz; Egarter-Vigl, Eduard, Zink, Albert*. Histological investigation of human mummified remains - Assets and drawbacks in the analysis of ancient tissue material

P26 *Krais, Simone*. Morbidity Reconstruction of Late Roman Migrants - A Palaeopathological Contribution to Prehistoric Migration Research

P27 *Studer, Catherine; Papageorgopoulou, Christina*. Results and hypotheses on living standards from stature estimation on a medieval population from Disentis/Muster (GR)

P28 *Konstantinou, Loukas; Zioli, Zoe; Gourtzioumi, I*. A hellenic grave of the geometrical period. Social Status and Disease

## INVITED LECTURES - ABSTRACTS

**L01** – Tuesday, Sept. 3<sup>rd</sup> h 11.00-12.00

### Trauma Analysis: Lessons from Modern Forensic Cases

*Ubelaker, Douglas H.;*  
*Smithsonian Institution - Washington, D.C.*

Trauma analysis represents a key aspect in the interpretation of skeletal remains of past populations. Accurate reporting requires an understanding of developmental aspects of skeletal anatomy, biomechanical properties of bone, as well as taphonomy. Evidence for perimortem trauma, likely associated with the death event must be distinguished from both ante mortem and postmortem alterations. Experimentation and casework within the field of forensic anthropology provides much of this needed information. This presentation synthesizes many of the complex issues involved, especially in relation to blunt force trauma, gunshot injury, patterned trauma, sharp force trauma and thermal alterations.

L02 – Tuesday, Sept. 3<sup>th</sup> h 14.00-15.00

## Globalization and children's diets: The case of the Maya of Mexico as the blueprint for translational research

*Bogin, Barry ;*

*Centre for Global Health & Human Development*

*School of Sport, Exercise & Health Sciences, Loughborough University, UK*

Globalization is, in part, an economic force to bring about a closer integration of national economies. At a deeper level, globalization is an international process for the interchange of world views, products, and the meaning of these products. Too often, this process is one-sided. The most powerful multinational corporations try to impose their products and meanings on the world. Industrially grown, processed and packaged foods are one class of products. Using meanings created by the food industry we are urged to consume and feed these products to our children. Food globalization brings about nutritional transitions. The Maya people of Mexico are a poignant case. Their diet is shifting from locally-grown, minimally refined vegetable foods, with small amounts of animal food, to a global diet of highly processed foods, rich in saturated fat, animal products, and sugar, but poor in some essential nutrients. Our research finds that Maya children tend to be very short but overweight. This combination comes with many risks for poor health. The case of the Maya is not isolated and we must come to terms with food globalization if we are to translate research into better child health and well-being.

L03 – Wednesday, Sept. 4<sup>th</sup> h 15.30-16.30

## Methods for adult and sub-adult age estimation based on documented human skeletal remains from Western Europe. Application in Osteoarchaeology and Forensic Anthropology

*Rissech, Carme;*

*Unit of Physical Anthropology, Department of Animal Biology, Faculty of Biology,  
University of Barcelona, Spain*

Accurate age estimation is fundamental in Osteoarchaeology and Forensic Anthropology. The age estimation methods, depending on the degree of the individual maturation, are divided into methodologies for adults and sub-adults. The accuracy of age assessment of these methodologies depend upon (i) the models on which the methods are based and (ii) the availability of appropriate data with regard to the population of origin. Adult age estimation is not straightforward and despite the numerous efforts made to improve it, some problems remain to be solved (less reliability and precision for individuals older than 60 years, estimates of the majority of individuals fall between 30 and 50 years, underestimation of elderly individuals and overestimation of young individuals). Regarding sub-adult individuals, age estimation methods are better solved, however a notable lack of information on the development of many skeletal elements from different populations has been highlighted. In this lecture a brief synopsis of the exposition of the acetabular method for adult age estimation based on Bayesian inference and the most useful Western European formulae recently published for sub-adult individuals based on Inverse Regression are presented. All of these methods derive from studies on the development of different postcranial elements based on modern skeletal data from five documented collections from Spain, Portugal and Britain. The acetabular method seems to make accurate estimates of age for adults of any age. The sub-adult formulae are interesting because they can be applied to individuals of unknown sex from within a wide age range.

L04 – Thursday, Sept. 5<sup>th</sup> h 09.00-10.00

## Worldwide variation of menarcheal age in relation to environmental and socio-economic indicators: interface between global, regional and indigenous factors

*Tutkuvienė, Janina;*

*Department of Anatomy, Histology and Anthropology, Faculty of Medicine, Vilnius University, Lithuania*

**Background.** Historically, decline in the average age at menarche had been related to better socio-economic conditions, nutrition, health and housing. Recently, early menarche was linked to the risk of obesity, metabolic syndrome, cardiovascular diseases, some cancers. Whether early or late menarche is an independent predictor of adverse adult outcomes or serves as a marker of the other risk factors - remains unclear. The purpose of present study was to analyze worldwide variation of menarche during the last decade in relation to different environmental and socio-economic factors of the population.

**Material and methods.** Recent variation in menarcheal age was analyzed in 40 countries (more than 50 references published during 2003-2013 y. were included). Different environmental, demographic and socio-economic indicators for those countries were drawn out from officially available websites of statistical data. Menarcheal age and family related factors were studied from Lithuanian and several other samples. Multiple correlation and principal component analysis was applied for data meta-analysis with the purpose to reveal factors that might influence menarche.

**Results and conclusions.** Worldwide variation in menarcheal age ranged widely: during the last decade, it was still related to countries' climatic, geographic and demographic indicators (latitude, altitude, average annual temperature, sunlight hours, rainfall, population density, etc.), also to gross domestic product (per capita), inequality adjusted human development index, urbanization and food consumption indicators. Family composition and social status was also interconnected to menarche. The onset of menarche might be explained by many global, regional and indigenous factors, but these multiple interrelationships require future investigations.

L05 - Thursday, Sept 5<sup>th</sup> h 14.00-15.00

## What Cupules suggest about early human symbolic capacity and the beginning of art

*Dissanayake, Ellen;*

*Independent scholar and Affiliate Professor in the School of Music at the University of Washington, Seattle (USA)*

Until recently, archaeological wisdom held that a “cognitive revolution” occurred sometime around 50 thousand years ago, when Homo sapiens in Western Europe developed the capacity to symbolize, as shown by evidence of language, religion and art. This “Creative Explosion” or “Big Bang” hypothesis has gradually been modified after discoveries from Middle Stone Age Africa and elsewhere indicate a much earlier date for “behaviorally modern” humans---from 100-120ky and even earlier. Evidence includes advanced stone tool technologies; increased geographic range; specialized hunting, fishing, and shell-fishing; complex processing of plants, fruits, and tubers; long distance trade; burial of the dead, processing and non-utilitarian use of mineral pigment; pierced shell beads; and geometric engravings on pieces of ochre and ostrich eggshells. The touchstone for attributing modern cognition to early humans, however, remains symbolic behavior so that any instance of “art” (ochre markings, engraved lines, even bone musical instruments) is automatically called evidence of symbol use. I argue that this Symbolic Reflex diverts attention from other notable early cognitive abilities in early humans.

The earliest known non-utilitarian artifacts made by humans are cupules - hemispherical indentations hammered into stone - , whose implications for understanding the cognitive and aesthetic capacities of early humans remain to be explored.

Made by even Homo erectus, and occurring in large numbers on every continent, cupules challenge reigning ideas about art-making and symbolizing capacities. Perhaps our notion of symbol, like that of art, needs further analysis and reformulation.

L06 - Thursday, Sept. 5<sup>th</sup> h 16.00-17.00

## Anthropology: Nature and Culture

*Wuketits, Franz M;*  
*University of Vienna, Austria*

In this presentation I am going to reflect the status of anthropology and its meaning for other disciplines. Anthropology - in its widest sense the study of humans - is split into several rather specialized disciplines at the crossroad of nature and culture. There is - or, at least, should be - agreement that there is no contrast between (human) nature and culture. However, cultural activities of any kind are constrained by the natural potentials of humans that are results of evolution by natural selection. Dobzhansky's famous remark "Nothing in biology makes sense except in the light of evolution" can be fully applied to the study of humans: *Nothing in anthropology makes sense except in the light of evolution.*

The theory of evolution offers the very fundament for a new synthesis in anthropology, which is needed if this field should not fall apart into a number of more and more narrow disciplines. Since this meeting is devoted to *perspectives* in anthropology, I consider it important to discuss a synthetic approach and its meaning in other disciplines that study particular aspects of humans by means of their own terminology and methodology, e. g. psychology and pedagogy.

Finally, I shall briefly discuss some philosophical implications of anthropology.

# LECTURES - ABSTRACTS

## SESSION 1 - PHYSICAL ANTHROPOLOGY

### A01 Geometrical properties of leg bones of human remains from two different archaeological sites in Germany

*Flohr, Stefan<sup>1</sup>; Möhle, Tobias<sup>1</sup>; Rösling, Julia<sup>1</sup>; Kierdorf, Uwe<sup>1</sup>*

<sup>1</sup> University of Hildesheim, Germany

Deviations of the position of the weight-bearing line of the leg (“Mikulicz-Line”) relative to the knee joint are known as genu valgum and genu varum . They might result from different causes, with severe deviations being considered pathological.

Misalignment of the leg causes abnormal loading and premature degeneration of the knee, upper ankle and lower ankle joints.

Geometrical properties of femora and tibiae of adult individuals of both sexes from an early medieval site at Greding (76 legs from 48 individuals) and from a monastic site at Schöningen, dating to middle medieval to early modern times (85 legs from 53 individuals), were investigated. The bones were placed in articulated position and photographed. The angle between the “Mikulicz-line” and the tibial long axis (AM), as well as the angle between the tibia plateau and the tibial shaft axis (AT) were measured on the photographs using Adobe Photoshop measurement tools.

One leg exhibited genu rectum (AM=0°). Most legs tended to exhibit genu valgum (N=144; mean value of AM's 2.3°) and only few legs genu varum (N=16; mean value the AM's -1.1°). No significant differences in AM and AT were found between the sites and sexes. However, a significant ( P =0.008) side difference was found for AM in the Schöningen assemblage. In total, AT was weakly positive correlated (R =0.61, P <0.001) with AM indicating that the orientation of the tibia plateau might partially compensate deviations in AM. The asymmetry in AM observed in the Schöningen assemblage might be related to the “monastic lifestyle” of the individuals.

## A02 Excavation of a Neolithic Dolmen in Switzerland

*Lösch, Sandra<sup>1</sup>; Rüttimann, Domenic<sup>1</sup>; Campana, Lorenzo<sup>2</sup>; Ramstein, Marianne<sup>3</sup>*

1 Department of Physical Anthropology, Institute of Forensic Medicine, University of Bern, Switzerland

2 Department of Forensic Medicine and Imaging, Institute of Forensic Medicine, University of Bern, Switzerland

3 Archaeological Service of the Canton Bern, Switzerland

In 2012 the Archaeological Service of the canton Bern excavated a Neolithic dolmen in the municipality Oberbipp. Repeated flooding episodes of a nearby stream covered the interior of the burial chamber with sediments during the prehistoric period, leaving the burials largely untouched. The 2.5 x 4.5m measuring dolmen consisted of different types of rock. The horizontal slab, an erratic transported by the Rhone glacier, weighted 7.5 tons. Due to preservation of human bones in the burial chamber fulltime anthropological supervision was necessary during excavation. A variety of methods and techniques were applied in the field, such as several 3-D surface scans and sampling for future ancient DNA analysis. A series of radiocarbon samples date the dolmen to the middle of the 4th millenium BC. Amongst the grave goods there were flint arrowheads, pendants made of animal teeth and a limestone bead. Skeletons found in their correct anatomical position were lying stretched out on their back. Most had a similar orientation, with heads towards the entrance of the dolmen. The preliminary anthropological on site investigations suggest approximately 30 individuals were buried. So far bones of males, females and children have been identified. Future research will include detailed morphologic-anthropological and paleopathological examinations. Stable isotope and ancient DNA investigations are planned to study social stratification, origin and migration as well as genetic relations of the group. With this research project we hope to gain new insights into Neolithic communities in Europe.

## A03 The temporal bias of sexual dimorphism in mandibular morphology of Central European *Homo sapiens*

Bergmann, Inga<sup>1</sup>; Wahl, Joachim<sup>1</sup>; Harvati, Katerina<sup>1</sup>

<sup>1</sup> Paleoanthropology Sect., Department Early Prehistory and Quaternary Ecology and Senckenberg Center for Human Evolution a. Paleoecology, University Tübingen, Germany

Sex determination of human skeletons remains a central issue in (Paleo)-anthropology. The human mandible, being highly sexually dimorphic, is a promising investigation object in this regard. Several studies suggest that morphological variation in general and sexual dimorphism in particular are related to spatial, temporal, functional and ontogenetic factors (Humphrey et al. 1999; Nicholson/Harvati 2006; Bastir et al. 2007; Thayer/Dobson 2010) We approach sexual dimorphism combining 3-D geometric morphometrics with conventional linear measurements and the qualitative description of features. This approach controls for size, allows an intuitive visualization of the data as well as rigorous statistical analysis, so as to explore the pattern of overall shape differences.

We measured 183 adult mandibles from three Central European temporally separated skeletal series, including a Neolithic, a medieval and a recent German/Belgian sample. Hence, conclusions can center on the temporal and regional aspects of morphological sex dimorphic variation. The data obtained comprise 61 bilateral and midsagittal landmarks, 44 linear measurements, one angle and ten non-metric traits.

Preliminary PCA plots show morphological separation between males and females that is connected to the corresponding time period. Further multivariate analysis (DFA, Regression, MANOVA) will disentangle those temporal and sexual dimorphic aspects of mandibular shape. Additionally, we will center on the extraction of the most dimorphic landmarks and distances as well as the creation of new indices. Our research can provide new opportunities for the study of hominid fossils as evolutionary bias in osteological morphology can only be resolved by knowing the inter-species variation of sexually dimorphic patterns.

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### Acknowledgement:

I would like to thank Hugo Reyes-Centeno (Research Associate, Paleoanthropology, University Tuebingen) for his help with data collection and statistics.

## A04 Study results from the medieval poorhouse cemetery at Minoritenweg, in Regensburg

*Von Heyking, Kristin<sup>1</sup>; Harbeck, Michaela<sup>1</sup>; McGlynn, George<sup>1</sup>; Grupe, Gisela<sup>2</sup>*

1 State Collection for Anthropology and Palaeoanatomie Munich, Germany

2 State Collection for Anthropology and Palaeoanatomie; Department Biologie I, Bereich Biodiversitätsforschung / Anthropologie, Ludwig-Maximilian University of Munich, Germany

The examination is focused on a medieval cemetery located in the Regensburg old town containing 417 individuals. The cemetery itself, however, was not located in the vicinity of a church. Historical records indicate that those interred at the cemetery were inhabitants of a rest- or convalescence home, yet no other information was available.

The goal of the study was to gain a better understanding of living conditions, nutritional status, and the medical therapies offered based on the analysis of the skeletal remains, as well as to the institution itself, catchment area, and the organization that administered it.

Morphological and archaeometric (isotopes and DNA) methods were both applied in this study. Evidence revealed that there was no identifiable rule as to how persons were admitted. Furthermore, fracture analysis results combined with the fact that only two medical procedures were performed, indicate that medical treated by a physician was not provided.

The majority of people that were convalesced at the home suffered under poor living and environmental conditions. The presumption of poor living conditions is supported in part by the aDNA analysis, whereby, individuals exhibiting craniosynostosis, a developmental defect that occurred in abnormally high frequency, were studied. Because no mutation could be detected, an environmental factor is thought to be the causative agent. Nutritional status was elucidated using the stable isotopes of carbon and nitrogen from bone collagen. The results suggest a diet containing a sufficient amount of protein.

Evidence for the catchment area was provided by isotopic analysis of the light and heavy elements oxygen and strontium, respectively, and showed that it was not restricted the near vicinity.

## SESSION 2 - PHYSICAL ANTHROPOLOGY

### A05 Violence or Accident? Traumatic injuries in the skeletal remains from the Psychiatric Hospital, Hall in Tirol

*Carlichi, Nadine<sup>1</sup>; McGlynn, George<sup>2</sup>; Zanesco, Alexander<sup>3</sup>; Seifert, Oliver<sup>4</sup>; Haring, Christian<sup>4</sup>*

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3 Stadtarchäologie Hall in Tirol, Austria

4 Landeskrankenhaus Hall in Tirol, Austria

The construction of a new forensic building on the grounds of the Psychiatric Hospital in Hall, Tirol, where an abandoned cemetery for patients was located, necessitated the exhumation of these graves. The discovery of a booklet containing the names and death register of 228 former psychiatric patients buried at this cemetery indicated that all had died between October 1942 and April 1945, a period infamously known for the practice of decentralized, so-called “wild euthanasia”.

According to archived hospital records, the mortality rate rose markedly between 1944 and 1945. This immediately led to the assumption that these patients were euthanasia victims. The initial task of anthropologists was to provide individual identifications and cause of death. This was achieved through interdisciplinary collaboration between anthropologists, archaeologists, historians and forensic scientists. Patient records that contained physical descriptions and health status were compared with skeletal and biomolecular examination results. Discrepancies between hospital records and anthropological findings soon became apparent. A high number of fractures primarily associated with trauma inflicted during interpersonal violence, e.g. fractures of the sternum, nasal bone, mandible, teeth, clavicle, nightstick fracture, boxer’s fracture, and multiple rib fractures were found during the skeletal examinations.

Although seemingly insignificant details to the patient’s health were often carefully noted in the patient anamnesis, the aforementioned fractures received no mention whatsoever, even though many of the fractures were certainly debilitating and would have been obvious for the visiting physician. In addition, a large percentage of the fractures were in different phases of healing and could be determined to have occurred during the hospital stay. Suggestions to the cause of these injuries include physical abuse by male nurses, inter-patient violence, or therapeutic treatments such as between October 1942 and April 1945, a period infamously known for the practice of decentralized, so-called “wild euthanasia”.

## A06 Skeletal metastatic carcinomas from Hungary (1st-5th centuries AD)

*Molnár, Erika<sup>1</sup>; Merczi, Mónika<sup>2</sup>; Marcsik, Antónia<sup>1</sup>; Bernert, Zsolt<sup>3</sup>; Józsa, László<sup>4</sup>; Buczkó, Krisztina<sup>5</sup>; Zádori, Péter<sup>6</sup>; Vandulek, Csaba<sup>6</sup>; Bíró, Gergely<sup>6</sup>; Hajdu, Tamás<sup>7</sup>*

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3 Department of Anthropology, Hungarian Natural History Museum, Budapest, Hungary

4 Department of Pathology, National Institute of Traumatology, Budapest, Hungary

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6 Kaposvár University, Health Center, Kaposvár, Hungary

7 Department of Biological Anthropology, Institute of Biology, Eötvös Loránd University, Budapest, Hungary

According to paleopathological records, tumors have a great antiquity. The prevalence of cancer in ancient populations might have differed from that in modern humans, because of substantial differences in environmental factors, life expectancy, and the availability of treatment. Our study presents three cases of probable skeletal metastatic carcinoma from the Roman Period (1<sup>st</sup>-5<sup>th</sup> centuries AD) of Hungary showing the development of bony metastasis of cancer without chemo- and radiotherapy.

All skeletons were subjected to a careful macroscopic investigation, which was completed with radiological and scanning electron microscopic analyses.

In one case the mixed nature and the localization of the lesions, as well as the sex and age of the individual suggest breast cancer for the primary focus. In the other two cases based on the mostly osteoblastic nature and the localization of the lesions, moreover on the sex and age of the individuals, the most probable diagnostic option is prostate carcinoma with skeletal metastases.

In view of the scarcity of cancer metastases diagnosed in archaeological specimens in general, identification of all examples of cancer in antiquity represents an important contribution both to paleopathology and to modern medicine.

### Acknowledgement:

The support of the Hungarian Scientific Research Found, OTKA NN 78696 is greatly acknowledged.

## SESSION 3 - ANTHROPOLOGY AND PREVENTION

### A07 Physical activity explains decreased skeleton breadth measurements in children today

*Scheffler, Christiane<sup>1</sup>; Rietsch, Katrin<sup>1</sup>*

<sup>1</sup> Potsdam University Human Biology, Germany

Overweight is a global epidemic problem and leads to high cost in health care systems. Besides in German children we have also shown a decrease in skeleton breadth measurements in a ten year comparison. We assume that low physical activity influenced this decrease like the high levels of BMI and we analysed the association between external skeleton robustness, body composition and physical activity. In a cross-sectional study 691 German children aged 6 to 10 years were examined in 2010 to 2012. Anthropometric measurements (height, weight, skin folds, and elbow breadth) as well as data of physical activity (pedometer, questionnaires) were collected. Out of it BMI, percentage of body fat and Frame-Index (describing external skeleton robustness) were calculated. Results show a positive association between physical activity and Frame-Index. Besides validation of the well known negative association between physical activity and BMI as well as percentage of body fat it was shown that external skeleton robustness was associated by the percentage of body fat, and BMI was associated by external skeleton robustness.

How far this development influences the future health-status of today's children is unknown, but we are afraid that we will find pathologies based on the decrease of external skeleton robustness in future. It seems to be necessary to implement more daily and professional physical activity in children's life, not only due to our results, but also by reason of decrease of motor abilities describing by other studies. Furthermore the reduction of external skeleton robustness is maybe a global phenomenon like overweight

# A08 Overweight and obesity defined by body mass index and waist circumference in children and adolescents from Thuringia

*Kromeyer-Hauschild, Katrin<sup>1</sup>; Schiller, Friedrich<sup>2</sup>*

1 Institute of Human Genetics, Jena University Hospital, Germany

2 University Jena, Germany

Data source:

Thüringer Landesverwaltungsamt/Thüringer Landesamt für Statistik/Gesundheitsämter in Thüringen.

The purpose of this study was to compare prevalence estimates for overweight and obesity defined by body mass index (BMI) and waist circumference (WC) in children and adolescents and to monitor changes in overweight over time. Data on measured height, weight and WC were obtained from the annually conducted health screens offered by the children's and young people's health service in Thuringia. The analyses were based on examinations in kindergartens, upon school entry and in 4th and 8th graders in 2010/11. To investigate time trends overweight estimates were compared between 1992 and 2011.

Overweight/obesity were defined by German and Jena reference values for BMI and WC, respectively. Overall, in 2010/11, 21% of the boys and 19 % of the girls were overweight (including obese), whereas the overweight/obesity prevalence increased with age (kindergarten: 10.5/3.9%, school entry: 11.9/5.1%, 4<sup>th</sup> graders: 18.2/7.1%, 8th graders: 10.9/9.3%). While the increase in the prevalence of overweight seen over the period 1992-2000 was marked, no or little change is noticeable in younger children (up to 4th graders) since 2000. Among adolescents, however, overweight is still increasing. When using WC a significantly higher proportion of children were defined as overweight or obese.

Health screens offered by the children's and young people's health service provide valuable information concerning overweight/obesity.

In addition to the BMI, commonly used as a surrogate measure of adiposity, WC should be routinely measured. WC, as an indicator of central obesity, may be beneficial in identifying children and adolescents at increased risk of subsequent obesity-related diseases.

## SESSION 4 - ANTHROPOLOGY AND PREVENTION

### A09 From growth in height to growth in breadth - The change in body dimensions among German conscripts and its impact for epidemiological research

*Lehmann, Andreas<sup>1</sup>; Rühli, Frank<sup>2</sup>; Woitek, Ulrich<sup>2</sup>; Staub, Kaspar<sup>2</sup>*

1 Universität Potsdam, Germany

2 Universität Zürich, Switzerland

Compulsory conscription data yield a year-by-year picture of cumulative growth of young men at a proscribed age. The analysis of long-termed trends in body height, weight and BMI based on an unchanged data source can be informative about evolving health status over time. Additionally, information about occupation and origin open the door for epidemiological research.

We present the most recent, individually accessible, measured annual data of body height, weight, BMI and body proportions of 19-year-old German men from the German Armed Forces in 1984-1999 and 2008-2010. By following aggregated long-term trends since 1950 we also add historic context to identify the onset of the current overweight pandemic.

The secular trend in height slows down around 1990. At the same time the historically unrivalled increase in BMI in the last 20 years started by a two-step increase in weight at the end of the 1980s and again since 2000. Changes in body proportions will be reported. In 2010 28% of the German conscripts were overweight ( $BMI \geq 25 \text{ kg/m}^2$ ).

The German data allows a regional identification of groups of young men at risk for cardiovascular disease down to the level of the seven military districts. Conscripts living in eastern Germany caught up in terms of BMI with the level of Westerners since the reunification in 1990.

Overall, a complex of genetic, epigenetic, and environmental factors are at work that both limit height growth and promote overweight today.

Acknowledgement:

Financial Support: Mäxi Foundation

# A10 Poor sleep quality is associated with higher cortisol increase after awakening and CLOCK gene polymorphisms in the Danish general population

*Dittmar, Manuela<sup>1</sup>; Olbrich, Denise<sup>1</sup>; Leick, Puk Channa<sup>2</sup>; Dalgård, Christine<sup>3</sup>; Ohm Kyvik, Kirsten<sup>4</sup>*

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2 Institute of Clinical Research, University of Southern Denmark, OPEN, Odense University Hospital, Odense, Denmark

3 Institute of Public Health, Department of Environmental Medicine, University of Southern Denmark, Odense, Denmark

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**Background and objective:** Sleep problems are common among the general population. This study analyzed whether poor sleep quality is associated with circadian clock genes and stress parameters. **Subjects and methods:** Sleep quality was assessed in 345 single twins (28-73 years), representative of the Danish population, using the Pittsburgh-sleep-quality-index. Good and poor sleepers did not differ in mean age, body mass index, and smoking status. Salivary cortisol concentrations after awakening and 30 min later were measured by enzyme-linked immunosorbent assay. From these concentrations, the cortisol awakening response (CAR) was calculated as stress indicator. Four common biallelic single nucleotide polymorphisms (SNPs) in the hCLOCK gene (rs1554483 C/G, rs3736544 A/G, rs4580704 C/G, and rs12649507 A/G) were determined by Sanger sequencing.

**Results:** Compared with good sleepers, poor sleepers showed longer sleep-onset latency, shorter sleep duration, and smaller sleep efficiency ( $P < 0.001$ ), but did not differ in bedtime and waketime ( $P > 0.05$ ). After awakening, poor sleepers displayed a higher cortisol increase (CAR) than good sleepers (188 vs. 154 nmol/L,  $P < 0.01$ ). Among poor sleepers, there were more carriers of hCLOCK rs3736544 allele G and rs4580704 allele G than among good sleepers (each,  $P < 0.05$ ). No significant associations were observed between these hCLOCK alleles and cortisol concentrations.

**Conclusion:** The higher cortisol increase in poor sleepers indicates that sleep problems are associated with a change in the activity of the hypothalamic-pituitary-adrenal stress system. In addition, specific alleles in the hCLOCK gene might predispose to sleep problems. Absence of association between hCLOCK alleles and cortisol concentrations suggests independent effects on sleep quality.

# A11 New references of BMI - percentiles of girls related to age of menarche

*Mumm, Rebekka<sup>1</sup>; Hermanussen, Michael<sup>2</sup>; Scheffler, Christiane<sup>1</sup>*

1 University of Potsdam, Germany

2 Aschauhof, Altenhof, Germany

As overweight and obesity in children are worldwide problems a correct classification of overweight and obese children is very important. Existing references of BMI - percentiles for children are depending only on chronological age, but it is well-known that children with a higher BMI develop faster than others. In the presented study the relation between height, weight and BMI as well as the age of menarche from 3803 10 to 17 years old girls based on data of the German KiGGS-study were analysed. The girls were divided into two groups, menstruating girls (N=2383) and non-menstruating girls (N=1393). The results show significant differences between both study groups in all features. Menstruating girls are in average taller (6.4 cm), heavier (11 kg) and have as a consequence a higher BMI than non-menstruating girls of the same age. Because of this, new references of BMI - percentiles respecting maturation status of girls for the classification of overweight/obesity were developed using LMS-method. Menarche is a good indicator for the individual development of girls. It is known that the adolescent growth spurt occurs later when girls are late developers. Also a critical weight is needed for the occurrence of menarche. The existing variability of developmental tempo in children, especially in age of menarche is an enormous chance of adaptation to changing environmental conditions.

# A12 The inside-view of the body - from antiquity until today

*Schneider, Annette*<sup>1</sup>; *Collatz, Klaus-Günter*<sup>2</sup>

1 SRH Hochschule Heidelberg, Germany

2 Albert-Ludwigs-Universität Freiburg, Germany

## Introduction:

The building up of positive body awareness describes an elementary part in child development and includes also the understanding of the interior of the body and its functioning. Recent researches suggest that body concepts develop in an orderly sequence (Glaun & Rosenthal, 1983). This starts in early childhood and is based on the perceptions of the body (Schneider, 2012). The question is if our body concepts include a kind of cultural heritage reflecting particular cultural ages.

## Methodology:

In current studies bodily concepts and body conceptions were investigated by asking the children and young adults to draw, within an empty body outline provided, what they thought was inside their bodies (Gellert, 1926; Schneider, 2012). For analysing body concepts drawings of the body interior from antiquity till this day were collected and compared with the results of these current studies.

## Results:

Ancient drawings mostly depict athletically trained bodies. It's not until the high middle age drawings of the body interior (made by adults) exist, however they have a high resemblance to the bodily concepts of today's children. With the beginning of the anatomical science in the 16<sup>th</sup> century drawings of the body interior became more detailed and mostly based on medical research.

## Conclusions

In all ages bodily concepts are mainly based on perceptions and are influenced by strategies of health maintenance. Children's bodily concepts became primally important in the beginning of the 20<sup>th</sup> century.

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Glaun D, Rosenthal D (1987): Development of children's concepts about the interior of their body. *Psychotherapie Psychosomatic*, 48, p. 63-67.

Schneider, A (2012). Das Körperbewusstsein bei Kindern und Jugendlichen. Entwicklung, altersabhängige Ausprägung und Einfluss auf gesundheitsfördernde und gesundheitspräventive Maßnahmen. Freiburg. Albert-Ludwigs-Universität. Available in <http://www.freidok.uni-freiburg.de/volltexte/8721>.

## SESSION 5-ARCHAEOLOGY

### A13 Ancient Pathogen Genomics: What we learn about the evolution of infectious disease.

*Krause, Johannes<sup>1</sup>*

<sup>1</sup> University of Tübingen, Germany

Genome wide data from ancient microbes may help to understand mechanisms of pathogen evolution and adaptation for emerging and re-emerging infectious disease. Using high throughput DNA sequencing in combination with targeted DNA enrichment we have reconstructed medieval bacterial genomes of *Yersinia pestis* and *Mycobacterium leprae* from skeletal remains. Phylogenetic analysis indicate that the ancient *Y.pestis* strain from the Black Death pandemic is ancestral to most extant strains and falls very close to the ancestral node of human infectious *Y. pestis* bacteria. Temporal estimates suggest that the Black Death of 1346 - 1351 was the main historical event responsible for the introduction and worldwide dissemination of currently circulating *Y. pestis* strains pathogenic to humans, and further indicates that contemporary *Y. pestis* epidemics have their origins in the medieval era. In contrast the medieval *M. leprae* strains fall within the current genetic diversity and are found on at least two main branches in the phylogenetic tree of leprosy bacteria. Dating analysis reveal a most recent common ancestor of both all *Y.pestis* strains and all *M.leprae* strains within the last 4000 years, suggesting that both disease may have a recent Neolithic origin. The extraordinary preservation of the *M.leprae* DNA allowed for the first time a *de novo* genome assembly of an ancient organism and indicates that some bacterial DNA may survive longer than vertebrate DNA in ancient remains. This will allow tracing the history of many infectious disease causing pathogens back to their prehistoric origin.

## A14 The Alemannic graves from Niederstotzingen in Baden-Württemberg, Germany - Molecular sex determination and mitochondrial haplogroup designation of the human skeletal remains

*Maixner, Frank<sup>1</sup>; Kim, Mi-Ra<sup>1</sup>; Coia, Valentina<sup>1</sup>; Wahl, Joachim<sup>2</sup>; Cipollini, Giovanna<sup>1</sup>; Zink, Albert<sup>1</sup>*

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2 Regierungspräsidium Stuttgart, Landesamt für Denkmalpflege, Arbeitsstelle Konstanz, Osteologie, Konstanz, Germany

The Alemannic graves from Niederstotzingen in Baden-Württemberg are the most important early medieval burials in southwestern Germany, a site well known as “Adelsgrablege”. In the early 7th century (ca. 600-630 AD) high-ranking warriors and their followers were buried here together with weapons and precious grave goods. Altogether fourteen individuals and three horses have been excavated and the human skeletal remains were analyzed anthropologically and paleopathologically (Creel, 1967). In the course of a PhD thesis (Zeller, 2000) three individuals of a multiple burial (grave 3) were further subjected to molecular analysis indicating a kinship between the individuals and unexpectedly one of the armed individuals was molecularly typed as female. Latter result stands in contrast to the anthropological data describing the individual as a “young gracile shaped male” and opened the discussion about a possible burial of an “amazon”. A recent anthropological re-examination of the skeletal remains confirmed and extended the previous anthropological results and marked a starting point for a molecular re-analysis focusing on the sex determination and mitochondrial haplogroup designation. The gender identification targeting the amelogenin gene and two further Y-chromosomal loci typed all analyzed individuals as males, including the previously identified “amazon”. Moreover, our haplogroup analysis targeting the hypervariable region 1 of the mitochondrial genome revealed no maternal relationship between the individuals in two multiple burials. The provisional haplogroup affiliation rather suggest a group of warriors of different origin.

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## A15 Revisiting the Iceman genome

*Krause-Kyora, Ben*<sup>1</sup>; *Hemmrich-Stanisak, Georg*<sup>2</sup>; *Maixner, Frank*<sup>3</sup>; *Zink, Albert*<sup>3</sup>; *Franke, Andre*<sup>2</sup>; *Nebel, Almut*<sup>2</sup>

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Ötzi, the South Tyrolean Iceman, one of the best conserved mummies, lived about 5,300 years ago during the Chalcolithic Period and was found on an Italian mountain pass in 1991. A draft genome of Ötzi was reported in 2012. Genomic sequences were obtained using the SOLiD technology (Life Technologies) and consisted of short 50-bp reads that covered approximately 96% of a human reference genome, albeit with a low coverage. Preliminary analysis revealed that Ötzi had brown eyes, O+ blood type, a predisposition to cardiovascular disease and possibly Lyme disease, and was lactose intolerant. Given Ötzi's dating to the Chalcolithic Period and his excellent preservation we decided to compile from a muscle sample a high-coverage genome that allows us to perform an in-depth analysis addressing evolutionary and disease-related questions. Employing the Illumina sequencing technology we obtained reads of 100 bp length that were sufficient to carry out a *de novo* assembly of consecutive sequences. The *de novo* assembly was possible because of the relatively large sizes of the template DNA and facilitated even the reconstruction of previously unknown sequences. In sum, we generated a full genome of a coverage and quality unprecedented so far in human aDNA research. In addition, the metagenome analysis of the obtained non-human sequences provides new insights into the decomposition processes of the mummy.

## A16 Genes, mountains and cultures: high genetic diversity among and within ethno-linguistic groups in the Alps

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From a Bio-anthropological perspective, Alpine communities offer an unique opportunity to study the impact of geographical factors and cultural diversity on the genetic structure of human populations. They are constituted by a mosaic of ethno-linguistic minorities (e.g. Franco-Provençals, Occitans, French, Slovenes, Germans and Ladins), whose geographical isolation has helped maintain most of their cultural traditions. A remarkable population diversity may be found even in subdivision of the alpine arch, such as Eastern Italian Alps, a relatively small area where groups of different language and social structure (Italian, Ladin and German) are settled.

We present high resolution Y-Chromosome data (17 STRs and 50 SNPs) from 15 alpine populations (610 individuals) belonging to the three main ethno-linguistic groups of eastern Italian Alps.

Our results highlight a high genetic diversity not only among but even within ethno-linguistic groups. This pattern seems to be due to the effect of small demographic size of founder groups and/or genetic isolation, while simulations based on the coalescent do not support any close dependence of observed intra-group diversity from present census size. Finally, extending our investigation to mtDNA, we found a strikingly different genetic pattern of uniparentally transmitted markers between Tyroleans and other groups probably associated with the cultural practice of the “Geschlossener Hof” in these communities.

### Acknowledgement:

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## A17 Late-Neolithic human samples used for TB paleomicrobial research

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It is well known that tuberculosis (TB) causes 1,5 million deaths every year, and one-third of the world's total population is infected with *Mycobacterium tuberculosis* (WHO, 2011). These facts give a great importance to paleopathological TB research too. Previous investigations carried out in some parts of the 5 th millennium BC osteoarchaeological series of Alsónyék-Bátaszék (western Hungary) have already provided interesting paleopathological cases of tuberculosis. Köhler and her colleagues detected an interesting case with Pott's disease (Köhler et al., 2012).

Molecular methods for the detection of mycobacterial ancient DNA (aDNA) have also been developed considerably in the last few years (Donoghue, 2008, 2011, Nicklisch et al., 2012). The good state of preservation of the material, the important chronological period of the series and the presence of classical TB symptoms encouraged us to carry out an aDNA test of TB-related lesions in grave-group #13 of the Alsónyék-Bátaszék series. Skeletal material of 39 individuals was chosen for the molecular investigation from grave-group #13, containing the case with Pott's disease (grave #4027). Presence of *M. tuberculosis* aDNA was studied in morphologically positive and negative cases, in order to estimate the actual prevalence of MTB (*Mycobacterium tuberculosis*) complex infection in the skeletal material.

Key words:

paleopathology, aDNA, skeletal tuberculosis, *Mycobacterium tuberculosis*, Hungary

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## A18 The history of leprosy from genome-wide comparison of medieval and modern *Mycobacterium leprae*

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Leprosy caused by the bacterial pathogen *Mycobacterium leprae* was present in Europe until the 16<sup>th</sup> century, though the disease is still endemic in many developing countries with over 200,000 new cases reported annually. To study the history of leprosy we extracted DNA from 5 medieval leprosy skeletons from Denmark, Sweden and UK and sequenced the genomes of the medieval *M. leprae* strains. One of the skeletons contained so well-preserved *M. leprae* DNA that a full *de novo* genome assembly of *M. leprae* at over 100-fold coverage was possible using shotgun sequencing alone. In addition, 7 modern genomes of *M. leprae* from biopsies of modern patients were obtained in this study using array-based enrichment. Hence we compared 5 medieval genomes with 11 modern strains including the 7 biopsies samples spanning different genotypes and geographic origins. The phylogenetic comparisons of modern and medieval genotypes revealed the presence of a *M. leprae* genotype in medieval Europe, which is now reported from the Middle East; another medieval strain exhibited striking similarity with the modern strains from the USA suggesting a European origin of leprosy in the Americas. Further, the divergence time of the MRCA for all *M. leprae* strains was calculated to be approximately 3500 years, which is consistent with the oldest osteological evidence for the disease in the archaeological records. The remarkable preservation of *M. leprae* DNA in comparison to mammalian DNA may open the perspective to trace back the pre-historic origins of *M. leprae*.

## SESSION 6 - ARCHAEOOMETRY

### A19 Insights into the influence of computed tomography on ancient DNA recovery

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Ancient remains such as sub-fossilized bones and teeth often contain minuscule amounts of highly degraded ancient DNA (aDNA) that can be studied. Before any destructive sampling, such specimens are often scanned by X-ray computed tomography (CT) techniques in order to study and preserve the structural information. The effect of X-ray irradiation on modern DNA molecules in hydrated conditions is well documented, involving chemical modifications of bases, breaks in the DNA strands and resulting base substitutions. The repair mechanisms, which allow withstanding moderate levels of radiation in living organisms, cannot longer fulfil these functions post-mortem. Ultimately, accumulation of DNA modifications may increase the difficulty of genetic analyses. The available literature on the effects of tomography technologies on aDNA is far from conclusive, CT-imaging of bones being mostly considered as non-destructive. To evaluate the effects of various scanning conditions on ancient DNA recovery, we designed a study using quantitative protocols previously established for high throughput sequencing on Pleistocene faunal remains. Using various instant radiation dosages and exposure times on a conventional micro-CT device and using synchrotron radiation, we tested common and extreme scanning conditions. Our results show that higher DNA losses can only be observed when using extreme irradiation conditions that are never used for complete specimen scanning. Common scanning conditions using both conventional and synchrotron X-ray have limited consequences that should be considered as acceptable in a majority of cases. To ensure that CT imaging does not alleviate DNA studies, we propose to respect a set of good scanning practices.

## A20 Life before death in an Imperial Age society (Rome, 1<sup>st</sup>-3<sup>rd</sup> century AD): the bioarchaeological answers.

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Recent archaeological surveys performed in Rome (Italy), have brought to light a small necropolis dating to Eneolithic. The Eneolithic is a key transitional period, between the Neolithic and the Bronze Age, often identified as the Copper Age. In Italy it is dated from 3600 to 2300 BC, mostly characterized by the increase of agriculture activity. The 14 individuals buried in the area have been anthropologically analyzed to assess the demographic profile of the community and to identify the morphological and/or pathological conditions. Health status, unspecific stress markers and an overall skeletal strength associated with the presence of marked muscle insertions, have been evaluated according to classical morphological analysis. The finding of two children in a single burial led to perform ancient DNA analysis to investigate the relationships between them. Stable isotope analysis of human remains offers a potential solution to analyze the basic subsistence level, since the isotopic ratios of carbon and nitrogen in bone tissue reflect the ratios of food consumed during the lifetime. The results underlined an overall satisfactory health condition that might be ascribed to a balanced dietary uptake. This trend is supported by regional archaeological evidences for the advent of technological innovations linked to intensive terrestrial plant processing. The results show how the integration of different kind of data is important to outline a complete biological profile of ancient populations.

### Acknowledgement:

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# A21 The St. Pankratius Churchyard in Altdorf/Düren - results of the morphological and archaeometric investigations of an 18th-20th century rural population

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Changes in life and health conditions of a modern population that existed during a period characterized by scientific progress, industrialization, but also in a time marred by war and the social and political upheaval witnessed between 1700 and 1900 are investigated. The impact of urban vs. rural settings on population dynamics during the Industrial Period in England have often been the focus of past studies. How did such a development affect the 180 individuals from rural Altdorf near Düren, Germany? Results from an extensive examination of the finds recovered from the St. Pankratius cemetery in Altdorf are presented and compared to historical sources.

Grave orientation allowed the burials to be divided into an earlier and a later phase. This facilitated a comparative study aimed at detecting potential differences and changes in diet, mobility and health conditions over the course of approximately 200 years. This was accomplished by identifying morphological markers on the skeleton and dentition manifested as a result of physiological stress and disease. Carbon and nitrogen isotopes of bone collagen and tooth structural carbonate were analyzed to determine the existence of dietary differences. It could be shown that in many cases the differences were not significant, indicating a degree of stability in living conditions and organismal stasis. One exception was arthrotic changes over time in the joints of the extremities, which showed an increase in females compared to males.

## A22 Stable isotope analysis of human bones from Roman Ephesus (Turkey, 2nd and 3rd ct. AD).

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During the investigation of a procession path between the Artemesian Temple and the Roman city centre of Ephesus the gladiator cemetery was discovered in 1993 and it dates from the 2nd to 3rd century AD. The aim of the project was to reconstruct special diet and living conditions from the inhabitants of Roman Ephesus and the distinct group of gladiators. Stable isotope (C, N, S) analysis were applied and the inorganic bone compounds (Sr, Ca) were analysed to get information about nutrition, migration and social stratification. In total, 53 individuals including 22 assumed gladiators were analysed. All individuals consumed C3 plants like wheat and barley as basic subsistence with a few individuals showing also signs for consumption of C4 plants. One female from the gladiator cemetery ( $\delta^{13}\text{C} = -18.2\text{‰}$ ) and two gladiators ( $\delta^{13}\text{C} = -17.8\text{‰}$ ;  $-18.2\text{‰}$ ) show different values in  $\delta^{13}\text{C}$  than the other individuals. The  $\delta^{34}\text{S}$  values for two of these individuals suggest that they probably migrated from another geographical region. The  $\delta^{15}\text{N}$  values ( $9.2 \pm 0.8\text{‰}$ ) are relatively low in comparison to other investigated sites of Roman times. A probable cause for the depletion of  $^{15}\text{N}$  in Ephesus could be the frequently consumption of legumes. Basic osteology and stable isotope analysis provide new information about the 2nd and 3rd century AD living conditions. The data presented in this study provide more information about everyday life from the population of Roman Ephesus.

## A23 Weaning in Medieval and Early Modern Times

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Weaning marks the complete cessation of breastfeeding, but it is not a single event which could be measured directly. It is mostly a process over a longer time period where infant diets are transformed from breast-milk to other food. The investigation of breastfeeding and weaning behavior can provide insights into health, cultural factors and reproduction of different populations. The weaning process in former times and also nowadays in poorer countries is associated with higher infant mortality. This is due to introduction of bacteria into the gastrointestinal system causing weanling diarrhea and malnutrition.

Stable carbon and nitrogen isotope analyses are a powerful tool for investigating weaning in past populations. To reconstruct weaning behavior in the Middle Ages and Early Modern Times skeletal remains from two different sites in Germany (Hettstedt/ Sachsen-Anhalt and Völklingen/ Saarland) have been studied. 356 subadults were analyzed concerning age, sex, paleopathology and carbon and nitrogen stable isotope ratios. Stable isotope results indicate a slightly different weaning behavior comparing the sites. In Hettstedt weaning took place between 1.5 and 2 years of age, but shows an early consumption of supplementary food around 6 month. Whereas weaning age in Völklingen was about 1 to 1.5 years. Mortality during the weaning period is increased at both sites.

## A24 Determining the origin of Imperial domestic animals from Ickern, Castrop-Rauxel - Quantification using $^{87}\text{Sr}/^{86}\text{Sr}$ isotope analysis

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The objective of this study is to determine the origin of cattle using faunal remains recovered at the archaeological site at Ickern, Castrop-Rauxel. The provenance of two cattle varieties, once common in former Germania, which differ both in size and robusticity, continues to be the subject of much controversy. Aspects surrounding the import of cattle from the Roman Empire to the Germanic region, which were situated on the left and right sides of the Rhine, respectively, are of particular interest in this investigation. Strontium isotope analysis was applied to 54 cattle tooth enamel samples. Additional baseline values were achieved by analyzing tooth Sr isotopes in red deer (*Cervus elaphus*), European elk (*Alces alces*) and wild boar (*Sus scrofa*). Strontium levels in nature vary according to the local geology and are incorporated into the hard tissues of mammals through food consumption, especially plants.

In contrast to bone, tooth enamel is not subject to continuous modification during life. Therefore, strontium incorporated into the Ickern cattle teeth during enamel formation will show the same isotopic ratio as the local geology of the location where the cattle remained during their physical development. The results of this study indicate that the phenotypically larger cattle do not stem from the Roman Empire and also that the growth-restricted cattle were not of local origin, as previously believed. A more extensive study of faunal remains from this period is necessary to better understand Roman and Germanic cattle husbandry in this area.

## SESSION 7 - FORENSIC ANTHROPOLOGY

### A25 Cemetery Munich West: Early diagenetic alterations of the organic and inorganic bone matrix after short inhumation times

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In the context of a cooperative science project investigating the diagenetic mechanisms affecting bone material and thus also the analysis of stable isotopes of light elements, 50 human femora from a modern Munich cemetery were analysed with respect to early diagenetic alterations to both the collagenous matrix and the mineral phase after short inhumation times. Time elapsed since death was eight to 60 years. Bone collagen preservation was scrutinized by the correlation between C/N molar ratio and chromatographically determined amino acid composition. Crystallographic properties of the mineral fraction were assessed using Raman spectroscopy and Fourier transform infrared (FTIR) spectroscopic measurements. The preparation of histological thin sections revealed only minor microbial activity among the sample collective.

The results from the different analytical methods suggest that alterations to both the organic and inorganic bone fraction, such as selective amino acid loss and recrystallization phenomena, can occur even after short burial times, showing no significant correlation to sample age. However, the potential influence of pathological conditions affecting the tissue, such as osteoporosis, needs to be evaluated as a factor possibly altering the data obtained from bone, which could be misinterpreted as a consequence of diagenetic effects.

## A26 Relating the duration of developmental periods to increment counts in enamel formed prior to and after birth

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Age-at-death estimation in skeletal remains of perinatal individuals can only make inferences on whether or not morphological or metrical markers indicate, that the individual was developed to an extent that it was potentially able to survive autonomously. By this approach stillbirths cannot be distinguished from individuals that survived birth and died shortly thereafter. The neonatal line (NNL), an irregular incremental marking discernible in the microstructure of the enamel of teeth starting to form in uterus, reflects the reaction of the enamel forming cells to the stressful transition of physiological conditions during the birth process. Identifying the NNL in sections of primary teeth provides the possibility to determine a reference point of individual development. By using counts of regular incremental markings, that were previously characterized by experimental and circumstantial evidence as exhibiting a daily periodicity, the duration of enamel formation can be determined in the areas located external (postnatal) and internal (prenatal) to the NNL. This study analyzes 18 primary teeth from 7 individuals from forensic cases and archeological excavations with the light- and scanning electron microscope. It aims to exemplify the potentials and pitfalls in the methodological framework for assessing if an individual survived birth and to determine the duration of the postnatal life span as well as that of crown growth in uterus. The latter enables inferences about the relation of tooth development to term birth. Analyses of this kind likewise provide valuable information in case work in forensic anthropology and in bioarcheology.

## A27 Hair strands as a diet record - New insights in forensic and archaeological hair analysis

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Analogous to the analysis of stable nitrogen and carbon isotopes of bone collagen, hair keratin can also be used to identify nutritional behaviour and the nutritional status. The advantage of hair analysis is the non-invasive sampling combined with high chronological resolution caused by sequential analyses along the hair strand. In contrast to collagen analyses, it is possible to reveal the alteration of the nutritional status during the last weeks or months before sample drawing, depending on hair length. However, this advantage also poses the challenge of correct isotope data interpretation by fast changing nutritional conditions like phases of malnutrition or starvation. Thus, we analysed the shift of nitrogen and carbon stable isotopes ratios in hair strands from three different groups: fasting persons, cachectic decedents and patients with Anorexia nervosa . Furthermore, we strongly suggest that the hair growth pattern is disturbed during malnutrition, because hair roots react very sensitive to protein deprivation. This may lead to a discrepancy in the chronology of the results. In a new approach we exclude all non-growing (non-anagen) hairs by modified trichorhizograms and phototrichograms to improve the results and their interpretation. In addition to this major topics we want to highlight further possibilities and limits of hair analysis in forensic samples and archaeological remains.

## A28 Thermographical detection of forearm vein patterns for identification

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In 2012, cases of credit and cash card fraud in Germany have increased about 22.4 %. One of the methods to identify a person who committed a comparable criminal act is the identification by photographic material. However, quality of photographic material (e.g. security camera footage) is often deficient as well as there is a lack of studies investigating the frequency and variability of characteristic traits in the population. Therefore, it is difficult to get an explicit identification of a person indicating that the existing methods should be improved. The vein pattern of the forearm as an objective and unmodifiable characteristic trait could be the basis for a reliable identification. The aim of this study was to analyse if the thermographical detection of forearm vein patterns is a reliable method for identification. For this, the forearm vein pattern of 52 participants was detected under different conditions with an infrared camera and the eligible veins were identified. This study showed no significant intra- and interindividual differences in respect of the amount, angles and distance of the veinbranches. Otherwise, it could be proved that the detection of the vein pattern is influenced by different environmental conditions like warmth, coldness and stimulants such as alcohol and nicotine, evidenced by significant differences regarding the width of the veins. Therefore, thermographical vein pattern detection does not seem to be a convenient method for identification. However, the detection of the vein pattern could possibly complement the existing methods for identification because of the difficulty in manipulation.

## SESSION 8 - ANTHROPOLOGY AND GENDER STUDIES

### A29 Social Amenorrhea - a new aspect of human maturation?

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Human growth and maturation, particularly the timing of adolescent peak height velocity and menarche are influenced by health, nutrition, and socio-economic factors. Since the mid-19<sup>th</sup> century the general physical development accelerated, menarcheal age decreased especially in industrial countries. Physical development and menarcheal age seems to be associated. It is generally assumed, that in modern populations menarcheal age occurs approximately one year after adolescent peak height velocity. This was different in historical times.

We aimed to investigate the association between the tempo of development and age at menarche. We collected and analyzed German studies on menarcheal age since 1848. Mean menarcheal age decreased from 18 to 12-13 years in Germany during the last 150 years. The age at peak height velocity decreased in Western Europe, as well. But the temporal association between these two events changed. In the mid-19<sup>th</sup> century menarche appeared to occur independently from the general physical development. This indicates a possible decoupling of physical development and menarcheal age. The delay in menarcheal age cannot be explained by improvements in nutrition, health and economic factors alone. We suggest that social influences lead to the dissociation between physical development and menarcheal age (social amenorrhea). We define social amenorrhea as a describing of the delay in menarcheal age and/or suppression of menstrual bleedings in otherwise healthy, normally developed girls due to psycho-social factors.

Social Amenorrhea will be discussed in the light of human maturation and reproduction.

## A30 Reproductive senescence -a gender perspective

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Reproductive senescence - a gender perspective Sylvia Kirchengast, Department of Anthropology University of Vienna, in both human females and human males reproductive function declines with advancing age, however there is a fundamental gender difference: whereas in human females reproductive capability ends irreversible during the 5th or 6th decade of life, human males do not experience a sudden arrest of gonadal function and male fertility persists until very old age. Numerous theories tried to explain the physiological as well as evolutionary basis of this marked gender difference. Human males are able to reproduce much longer than human females, their reproductive success however shows a high degree of interindividual variability. In the present paper male and female experience of reproductive ageing are analysed and interpreted from an evolutionary as well as a gender perspective.

## A31 The relationship between menopausal status and body structure

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**Background:** The number of postmenopausal women in our ageing societies is increasing, thus the importance of "status quo" studies on menopause and the risk factors of early onset of menopause is increasing. The purpose of the research was to study the relationship between the menopausal status and the body structure (body composition, bone status) of women in Hungary. **Subjects and Methods:** a random sample of 1097 Hungarian women (aged 40-65 ys) was investigated between 2011 and 2012. Subjects were divided into premenopausal, early and late perimenopausal and postmenopausal subgroups by considering the menstrual bleeding characteristics. Body composition was estimated by body impedance analysis and by the Drinkwater-Ross anthropometric method. The general bone status was assessed by using the DTU-one osteometer. **Results and Conclusions:** former epidemiological studies suggested that the menopausal transition is associated with significant changes in body structure. Our results evidenced these significant changes in body structure by reproductive ageing in women, but an important shift between the changes in fat and lean body mass was found: considerable decrease in absolute bone mass and absolute lean body mass was found in the transition from late perimenopausal status toward postmenopausal status, while significant decrease in absolute body fat mass was observed earlier, i.e. between the early and late perimenopausal status. The bone structural parameters (SOS, BUA) showed very similar differences between the menopausal status subgroups as in the case of absolute bone mass, this could imply that bone system changes not only in its absolute mass, but also in its structure in the perimenopausal period. Changes in the total body water content and in the absolute and relative lean body mass revealed that muscle mass decreased more intensively than bone mass between the late perimenopausal and postmenopausal status. The earlier onset of menopause the more pronounced changes were found in these trends of body mass components by reproductive ageing.

**Acknowledgement:**

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## SESSION 9 - PANEL: ETHOLOGY OF THE ARTS

### A32 Art as behaviour - towards an ethology of the arts

*Sütterlin, Ch.<sup>1</sup>; Schiefenhövel, W.<sup>2</sup>; Lehmann, Ch.<sup>2</sup>; Forster, Johanna<sup>3</sup>; Apfelauer, Gerhard<sup>2</sup>*

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2 Human Ethology Group, Max-Planck-Institute for Ornithology, Germany

3 Andrago München, Germany

#### Panel:

Why do we perceive an image of a landscape painting as beautiful? Why are we attracted by rhyme and poetry? Why do we experience shivers while hearing specific melodies in music? We perceive a room as expressing a 'pleasant' or 'cold' atmosphere, a Verdi-opera elicits pleasure and arousal and some urban public places invite us to stay while others do not. The fine arts, architecture, music and literature have, in recent years, increasingly been examined from the vantage point of human ethology and evolutionary psychology. The mystery of our responsiveness to environmental stimuli roots in the long history of sensorial adaptations during human evolution. Our understanding and emotional interpretation of environments are influenced by deeply rooted dispositions. This ethological approach to art as behaviour, taking into focus possible phylogenetic adaptations which have shaped the artistic capacities of our ancestors, aims at a better understanding of the various facets represented by the arts. Rather than culture specificity, which is stressed e.g. by cultural anthropology, universal human tendencies to perceive, feel, think and behave are postulated (Sütterlin et al 2013). The 'Ethology of the Arts'-group's panel covers introductions into the four categories visual and verbal art, music and architecture, by: Ch. Sütterlin: Prehistoric face representations - historic or timeless prototypes?. Ch. Lehmann: Leitmotiv and Liebestod: Notes on Richard Wagner in the perspective of evolutionary aesthetics. G. Apfelauer: From Kaluli music to Messiaen and Schoenberg: Common ground of aesthetics of musics worldwide. J. Forster: Notes on human friendly environments - urban ethology. W. Schiefenhövel: Powerful words. Lyrics in nonliterate Papuan societies. Presentations give insights to approaches and current research results.

## SESSION 9 - HUMAN ETHOLOGY

### A33 Beads and Beauty. On the Prehistory and Human Ethology of Body Decoration

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Many researchers, artists, craftsmen, and bead-users alike have argued that the primary function of beadwork is that of beautifying the human body (e.g. Erikson 1969; Dubin 1987; Price 1991; Coles and Budwig 1998; Dissanayake 2009). Cognitive science studies suggest that there would be a number of innate rules or mechanisms in the quest for beauty, as for example the search for novelty and surprise, equilibrium between the parts and the whole, symmetry, repetition, exaggeration, color play, and shared emotions (e.g. Dissanayake 1992, 2009; Eibl-Eibesfeldt & Sütterlin 2008; Ishiku and Zeki 2011; Changeux 2012; Conway and Rehding 2013; Bohrn et al. 2013; Krentz and Earl in press; and references in these articles). Can we trace such elements of beauty in some of the earliest known cases of body decoration, i.e. prehistoric beads? This contribution, will tentatively try to address this question by presenting an overview of the many instances in which humans use beads to communicate in an a priori emotional and beautiful way, and by drawing on the results of the study of ethnographic and prehistoric beadwork.

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## A34 Symbolic order between nature and culture

*Wimmer, Manfred<sup>1</sup>*

1 Arbeitsgemeinschaften AHS-NOE

Formation and usage of symbols can be considered as a core character of humans. According to Luhmann, symbols and symbolic systems play a major role for the generation of social coherence and the reduction of social complexity. In contrast to basic assumptions of AI-research and linguistically orientated philosophical positions, symbols as well as symbolic systems are not taken as neutral signs computed by specific rules and governed by language, but are to be understood as systems whose architecture is strongly influenced by the underlying affective base, causing something like “attractor effects” on cognitive contents. Within ontogeny educational activities are essential for the generation of these symbolic systems and it will be one of the major goals of this talk to elaborate the role of these basic affective patterns in all participants of educational activities.

## SESSION 10 - ANTHROPOLOGY AND PEDAGOGICS

### A35 Homo educabilis - anthropological contributions to the current discussion of education

*Forster, Johanna<sup>1</sup>*

1 Human Ethology Group

In the historical course, the discussion of education in the broadest sense was strongly based on forms of a tabula rasa-concept, i.e. above all environmental influences on the individual. The current approaches extensively ground on recent research in neurobiology, genetics and endocrinology focusing on biologically defined patterns of learning. For example, neurodidactic, combining neuroscience and teaching methodology, is an expanding field aiming to optimize learning mechanisms. Education and learning are more and more becoming evidently definable processes and these explanations clearly influence the cultural discourse and understanding of the educated and educable human being. At the same time, the more holistic education paradigm following Humboldt's famous demand seems to be jeopardized. Yet again, the traditional discussion of nature versus nurture is in the focus. Anthropology can very well contribute to the current discussion. Basically, the need to be educated and the enormous ability to respond to any form of education are central human characteristics evolved in human phylogeny. In terms of evolution, education implies the revolutionary consequence of cultural development. The presented anthropological point of view focuses on these aspects of the phenomenon's development and the adaptive value for the individual and the group. Furthermore, anthropology shows that learning, being educable and becoming educated, comprise all facets of the human being. This aspect will be discussed in respect to the current discourse of a strong focus on particular educational aspects towards efficiency and an apparent shift to an increasingly social-technological understanding of the human being.

## A36 Evolution and selfunderstandig today

*Tsioli, Zoe<sup>1</sup>; Konstantinou, Loukas<sup>1</sup>*

<sup>1</sup> Greek Anthropological Association of anthropological museum, medical school, University of Athens, Greece

It is important for an integral anthropology to define und formulate again notions and concepts and to develop new research-models, which overcome the dichotomy and make the dialogue between nature-culture possible. In order to succeed in it, we need a new self-understanding, a new human image that is not one-sided and which is the right one for the polymorphism and the complexity of humans. Homo Sapiens developed not only his intellect but also his feelings and social behaviour. All three of them make a unity and we cannot disturb the balance of this unity without producing problems for human beings .We call this unity “biological sociability”. For the primates the creation of bodily contact, of bond and attachment with another person belongs to the fundamental needs of the infant. In the social form of mother-child dyad, the infant will have the experience of interactions according to its phylogenetic and ontogenetic predisposition and the child has the possibility to develop the feeling of safety that belongs to its prime needs. But the way a human being experiences the feeling in the prime bond depends in a certain extent on the way of differentiation among the several cultural groups. It is important to promote the dialog and the creation of satisfying relation with the natural and social environment and that is what influences definitely the relation of the prime mother-child dyad and mainly, the character of pedagogic and edukation But the basis of it, what kind all of it is, depends on our self-notion and selfunderstandig.

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## SESSION 11 - PHYSICAL ANTHROPOLOGY

### A37 Recommendations for the Care of Human Remains in Museums and Collections

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Many German museums and collections are home to human remains from all over the world, including skeletons, mummies, bog bodies, or ethnological objects including parts of the human body. In the light of increasing claims for the return of human remains and a growing sensitivity towards the handling of human remains in collections, a 'Human Remains' Working Group of the German Museums Association, including ethnologists, archaeologists, anthropologists, medical historians, cultural scientists, lawyers and ethicists, published 'Recommendations for the Care of Human Remains in Museums and Collections'<sup>1</sup>. They were developed on the basis of a UK guidance<sup>2</sup> and the German 'Recommendations on the treatment of human remains in museums, collections and public spaces'<sup>3</sup>. The latter, however, does not apply to anthropological collections in practice. The recommendations are intended to facilitate decision-making with a view to ensuring the responsible handling of human remains in the work of museums and collections. One particular objective is to raise awareness of the sensitivity of the issue in order to ensure ethical responsibility in the handling of human remains and in dealing with claims for return made by the State of origin, people of origin or individuals. It is in the very nature of the matter that consideration must always be given to the individual case in question. As a general rule, there are no simple answers that can be applied equally to all collections of human remains.

The presentation will review the work of the interdisciplinary group and discuss implications of the recommendations.

<sup>1</sup> Deutscher Museumsbund (Hrsg.) 2013. Recommendations for the Care of Human Remains in Museums and Collections, published online, PDF available at: [http://www.museumsbund.de/de/publikationen/online\\_publikationen/](http://www.museumsbund.de/de/publikationen/online_publikationen/)

<sup>2</sup> Department for Culture, Media and Sports (DCMS), DCMS Working Group on Human Remains Report. 2003 (Update 2007), Guidance for the Care of Human Remains in Museums, PDF available at <http://webarchive.nationalarchives.gov.uk/> and <http://www.culture.gov.uk/>

## A38 The burial of a doctor in the ancient Acharnai/Hellas.

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After death, in rich graves of ancient doctors were given often everyday objects and medical instruments. Written remains of several periods describe certainly the sort of ancient instrumentaria. Also names of ancient doctors have been discovered, like the first known female doctor in Acharnai (Brock 1994:340). 2006 in Acharnai near Athens a marmor sarcophag was discovered. Between the finds there were the fragments of a human skeleton near two bronze medical instruments. In the basis of the sarcophag was found a wooden plateau, the reason of the dark colour of the bone surface. Considering the morphological criteria it seems to be an adult man, although the exact age isn't clear yet. Fragments of the skull, the pelvis, and the long bones of the right and left body side are present. Most of the joint surfaces show degenerative changes. Coxa vara is obvious for both hip joints and Insertionstendinosis must have given pain in the left ankle. The right sternoclavicular joint shows intensive changes like in case of an inflammatory joint disease. There is a difference between the degenerative affection of the right and left body side. Also a muscular disbalance like in case of skoliosis could exist. The skeleton of an ancient doctor gives informations about common medical instruments, his everyday life considering the intensive degenerative changes, but also about burials of important individuals of the certain period.

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## A39 Archaeology and Anthropology of southern Swiss alpine cemeteries from medieval times: Characterization of population and settlement between local ecology and transalpine mobility. Preliminary Results

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This interdisciplinary project comprises three aspects: an archaeological study, physical anthropological examinations and stable isotope investigations. The human remains date to the medieval period (600 - 1300 AD). The excavated areas are located in the southern alpine valleys, which played an important role along the north-south route that links the Italian peninsula to central Europe. 15 excavation sites with approximately 300 graves were investigated: 13 derive from canton Ticino and two from the Misox valley in canton Grisons. The material generally comes from the surroundings or the inside of Christian churches or from fortified settlements. The graves display a chronological construction linked to the building phases of the edifices, which is correlated with radiocarbon dating. Up to now 430 individuals were investigated: 120 males, 110 females, 40 indeterminate adults, 20 juveniles and 140 infants. Stable isotopes studies will follow in the future. The research is situated in a global current of medieval archaeology. On the one hand the funerary archaeology and on the other hand the development of innovative methods in physical anthropology. Bringing together the disciplines we hope to complement the knowledge of medieval populations in southern alpine Switzerland. Most relevant aspects are the typology and chronology of funerary structures, the identification of human ensembles and a social structure based on customs, diseases and subsistence strategies.

### Acknowledgement:

The interdisciplinary project is supported by the Swiss National Science Foundation (SNF, CR1111-142798).

# A40 Artificial cranial deformation among the Avar Age populations of Eastern Hungary

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2 Department of Archaeology, University of Szeged, Hungary

Artificial cranial deformation (ACD) had a very important role in the early medieval history of the Carpathian Basin. The aim of this research was to collect and revise all published and unpublished Avar Age (6-9 th c. AD) burials with artificially deformed skulls from Eastern Hungary (Tiszántúl region) from the viewpoint of both archaeology and anthropology. Based on their earlier work on ACD cases of Hungary (Bereczki-Marcsik 2006) and novel data collection, the authors found 14 certain cases from 7 Avar Age sites in the Tiszántúl region among a total of 342 cases from 140 sites (3-9 th c. AD) in the current territory of Hungary. Two different deforming styles were observed in the Avar Age sample. The results also clearly indicate that the custom of ACD, which was widespread in the earlier phase (5-6 th c. AD) did not disappear entirely after the fall of the Hun Empire and the Gepid Kingdom, as it was usually considered in the past. Based on the anthropological and the archaeological data we can assume the survival of the previous communities in the Avar Age at some of the sites. At other sites, survival can definitely be excluded. ACD was rarely practiced in the Avar Age. However, because of the small number of cases at this moment, further data collection and revision of earlier examined Avar Age materials are necessary to strengthen conclusions.

## Acknowledgement:

The study was supported by the Hungarian Scientific Research Fund, OTKA NN 78696.

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# A41 Prone Burials in Roman Antiquity: Peculiar in life and in death?

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The Roman burial site «Mainz-Kurfürstenstraße» comprises beside the customary supine burial positions, six inhumations in prone position. These deviant burials commonly reflect an exception in all periods. Up to now there is no scientific consensus for this mortuary practice. For Roman times the archaeological record draws a heterogeneous picture: Hastily buried individuals without gravegoods are opposed to inhumations with rich gravegoods buried in wooden coffins. Written records about what motives the people in ancient times would have had to bury some of the deceased face down are unknown for Roman antiquity.

Could the anthropological data of the deceased shed light on this type of deviant burial? Based on the findings in Mainz, a systematic literature research was started with the intention to catalogue anthropological data of prone burials in the Roman empire, with a special focus on the northern provinces. Demographic analyse show first results: Although both sexes are represented in the sample, males are more often buried in prone position. Children and older people represent the minority.

The cross-country synopsis also suggests regional distinctions. Perspectively the ongoing project needs to increase sample size and involve new anthropological and archaeological parameters to find an explanation for the phenomenon of prone burials in Roman antiquity.

## A42 News from the old chief - Grave 43 of the Varna necropolis revised

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The seaport of Varna is known as a holiday destination on the northern Bulgarian Black Sea Coast. Back in the Year 1972 a construction worker discovered some golden items. The following archeological excavations uncovered a chalcolithic necropolis that became famous overnight. So far, its gold findings are the oldest ones worldwide. About 6 kg of the precious metal were recovered, one sixth of it alone in grave No. 43. Because of the kind and amount of grave goods, the buried individual was seen as an important public figure from the day of its discovery. Quickly he was awarded the title of a chief or priest leader. The results of anthropological studies supported this assumption. The burial ground and grave 43 in particular became evidence of the beginning of social stratification during the copper age. Unfortunately the excavator died suddenly and only some papers have been published so far. One part of a recent DFG funded project in preparation of an upcoming publication was the re-examination of the human remains. One of the 188 graves which delivered bones for the study was No. 43. The results let appear some previous assumptions in a different light.

## A43 Traumatic alterations and their interpretation. Systematic anthropological analyses of the medieval osteoarchaeological material of Perkáta - Nyúli-dulo (Hungary)

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Bone alterations related to traumatic events are usually easily observable lesions in osteoarchaeological series, characteristics and distribution of them may inform us about the populations' everyday life. In particular cases, typical signs of interpersonal violence are also recognizable, and association between these pathological conditions and burial practices is seen.

During the preventive excavation conducted in connection with the construction works of the bypass near Perkáta (Transdanubia, Hungary), a complex settlement and a three-phase cemetery were excavated. Although the devastation of burials and the reutilization of graves impede the complete reconstruction of the site, on the basis of the archaeologists' estimation the cemetery includes about 4500 graves. The most important and most extended period of the multilayer cemetery is the Middle Ages.

Two different populations can be examined in the cemetery. Graves belonging to Hungarians are dated to the 10<sup>th</sup>-13<sup>th</sup> centuries AD, but the site also contains burials of the Cumanians, who arrived from Eurasian steppe and settled down in the same area after the Mongol invasion (1241-1242 AD). This historical background in the Perkáta-Nyúli-dűlő cemetery provides possibility to compare the original Hungarian and later arrived Kun populations, and to capture possible differences and commonalities between the societies.

The aim of our study is to present the characteristics of traumatic alterations found in the skeletal material of 500 skeletons. On the other hand, we would like to present and interpret those cases, where the interpersonal violence is clearly demonstrable.

A44

## SESSION 12 - MUMMY STUDIES

### A45 The Ankhpakhered Mummy Project: Endoscopy and Analysis

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3 Fatebenefratelli and Macedonio Melloni Hospital, Milano, Italy

4 Egyptian Section of the Buonconsiglio Castle, Trento, Italy

The mummy, placed inside a painted wooden coffin dated to the 25th Dynasty, and belonging to Ankhpakhered, a priest of Min in the temple of Akhmim, is displayed at the Civic Archaeological Museum of Asti. The mummy and the coffin are the subject of the research conducted by the Ankhpakhered Mummy Project in three steps consisting of: x-ray examination, whole body computerized tomography scan (CT) and endoscopy. Previous analytical work on this mummy, based on conventional x-ray imaging and the 2009 CT scan demonstrated that the body belonged to a skeletonized adult individual. The essential parts of the body are completely disturbed, and the skeleton is supported by palm-rib canes. Neither amulets nor jewellery are present. The 3D reconstructions confirm the earlier x-ray survey. The collected data suggest that the work habits of this individual involved carrying heavy loads or similar activities that greatly stressed the lower part of the body. As the second step of the research related to this mummy, an endoscopic examination was performed by a multidisciplinary team to collect some specimens for analysis. The tests increased our knowledge about this individual.

## A46 The Priestess of the Natural History Museum of Venice, Italy: an Egyptian mummy from the “Crocodile Grotto”

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6 Reiss-Engelhorn-Museen, Mannheim, Germany

The Miani's collection of the Natural History Museum of Venice harbours, beside precious ethnological goods, one Egyptian human mummy (MSNVE-7696) accompanied by two mummified Nile crocodiles (MSNVE-6863/64). The mummies have been found in 1862 by Giovanni Miani (1810-1872) in a cave named Crocodile Grotto which is situated next to Manfalut in Egypt. Miani donated the mummies to his hometown Venice and since 1880 they were displayed in the museum. Due to the advanced state of decomposition of the mummies the scientist Enrico Filippo Trois (1838-1918) was in charge of the restoration, but unfortunately his records have been lost. Initially, in this study a more in-depth research about the history and the finding place of these mummies was performed. In 2010 computer tomography (CT) scanning permitted anthropological, paleopathological and conservation studies to be carried out. The mummy was an about 50-60 year old woman and the analysis revealed some pathological and a high level of post mortem alterations, an inaccurate mummification and more details about the methods of conservation applied at the end of XIX century. Radiocarbon analysis (C14) confirmed the previous hypothesis, based on the embalming characteristics, concerning the time period of the human and crocodile mummies. Additionally, the elemental analysis of the embalming resins detected a high level of mercury and arsenic, thereby confirming the usage of heavy metals in the conservation technique of Trois. In summary, the anthropological and molecular studies including dating and elemental analysis further extend the knowledge on this particular cultural heritage.

# A47 Trophy heads and warrior belts - The contribution of physical anthropology to the history of the Mundurucu Indians of Brazil

*Alterauge, Amelie<sup>1</sup>; Schultz, Martin<sup>1</sup>; Rosendahl, Wilfried<sup>1</sup>; Schlothauer, Andreas<sup>2</sup>*

1 Reiss-Engelhorn-Museen, Mannheim, Germany

2 Ethnologe

Living in the basins of the lower Amazon tributaries, the Mundurucu Indians were known in the 18th and 19th centuries as warriors who took enemies heads as trophies in order to process them to visible proofs of prowess, namely mummified heads and tooth belts. Few ethnographic sources report on the manufacturing process and social context of these objects. In contrast to the better known trophy heads, the tooth belts of the Mundurucu are not only a rare group of objects but also one that did not gain much scientific interest until recently.

Based on seven examples kept in museums in Stockholm (Sweden), Belém (Brazil) and Philadelphia (USA) a general description and contextualization as well as a comparison with archaeological and ethnographic data will be given. Attached to a belt made out of plant fibre are perforated human teeth by way of a string adorned with chromatic glass beads. For the first time anthropological research has been done on the teeth and compared to existing historic descriptions of the belts. Until now it is impossible to positively connect the individuals made into trophy heads to the teeth of the belts though the trophy heads invariably miss all their teeth. Examination has shown that contrary to ethnographic descriptions the teeth of more than one individual have been used to create a tooth belt and not all teeth of the jaw were used. While all teeth on the Mundurucu tooth belts belonged to adult persons, the belt of the Kircher-collection in Rome raises additional questions concerning the involvement of children in war or alternative uses of the belts in neighboring cultures.

## A48 The Meran Mummy: the old egyptian lady

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6 Civic Meran Museum, Italy

7 Ufficio Beni Archeologici of the Province of Bolzano, Italy

The mummy and the associated coffin are preserved at the Civic Museum of Meran (BZ, Italy). The mummy is adorned with remnants of cartonnage decorations that date to the early Ptolemaic Period. The coffin is a sparsely decorated anthropoid type, dating to a period earlier than the mummy. The collar's decoration corresponds to designs current in the late 4<sup>th</sup> century BC. The hieroglyphic text presents the identity of the coffin owner as "(Mut (or Bast) en (es) ankh, daughter of the wardrobe priest (*sm3ty*) of Ipou (Akhmim), Irethorrou." The title of the coffin owner's father is connected with the worship of the fertility god Min (of Akhmim) and leaves no doubt that the burial container was produced in the same location as the cartonnage found upon the surface of the mummy. The CT scan of the mummy has been performed to investigate the biological profile of the body, long thought to be that of an "older" female. Additionally the scan data will be used to assess the methods used in her mummification for purposes of understanding the relationship of body preparation patterns and social identity. For example, the body lies with arms crossed on the chest, the pattern typically used in the burials of adults during the Ptolemaic Period, and particularly common among members of the Akhmim priesthood. Questions about the individual's persona arise in relation to signs of skeletal stress in the mummy, present in the form of many fractures, most of them localized in lower limbs and pelvis.

## POSTER - ABSTRACTS

### P01 "Transalpine mobility and culture transfer": Research Unit of the German Science Foundation (FOR 1670)

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3 Dept. of Geo-and Environmental Sciences, LMU München, Germany

4 Biocenter, Anthropology, LMU München, Germany

Isotopic mapping has become an indispensable tool for the assessment of mobility and trade in the past. This project aims at solving one prominent limiting factor inherent to this type of study which is the redundancy of geologically defined isotopic ratios. Associated problems include ambiguous definition of place of origin of the bioarchaeological material analyzed due to low spatial resolution, an insufficient differentiation between original isotopic ratios in the finds compared to those that are diagenetically altered, and the lack of appropriate regional isotopic maps. This renders the determination of migrational direction nearly impossible. In addition, the abundant bioarchaeological substrate represented by cremated finds has so far been neglected. The intention of this project is to:

- construct an isotopic map of a reference region of eminent archaeological importance (the Alps and its northern surroundings) by application of an isotopic fingerprint consisting of 4 to 5 isotopic ratios (oxygen, strontium, lead ),
- focus on the analysis of cremated material (  $\delta^{18}O$  not applicable),
- conduct an in-depth mineralogical identification of the nature of the analysed material to safely discern between diagenetic from biological isotopic signatures,
- define an individual isotopic fingerprint by novel data mining methods,
- produce a fine-scaled reconstruction of place of origin and migrational direction of non-local skeletal finds of humans and animals,
- integrate the data into a freely accessible data bank (world wide data sharing).

Poster I introduces the general context of this research group with its subprojects, posters II and III focus on novel approaches for physical anthropology: the systematic mineralogical characterization of cremated finds, and the data processing.

## P02 A 6000 Year Old Hand Amputation from Bulgaria

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In 2006 a skeleton with a unique pathology of the right forearm was found at Tell Yunatsite in South-West Bulgaria. This may represent the earliest case of amputation by surgery in South-East Europe. The individual dates back to the end of the fifth millennium, connecting it to the Late Copper Age of that region. The Chalcolithic settlement on the tell ended immediately after a bellicose assault. Therefore, the question arose if the loss of the hand may be connected with this incidence. Anthropological studies in close collaboration with the archaeologists on site made clear that the abscission took place at an earlier time in life and that the individual survived this sever intervention for many years. The results are presented on this poster.

## P03 A Late-Slavic elite grave in Stolpe at river Oder/Germany

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In autumn 2012 BLDAM and University Göttingen identified an elite grave northeast from a late-Slavic stronghold in Stolpe. Rich grave goods determine its archeological significance.

This includes a ferrous metal bowl, a knife with a bronze-shod sheath, a belt clasp made of ferrous metal with animal head ends and rivet, an iron projectile and a sword from the Oakeshott Type XI. The grave goods can be attributed to the first half of 12<sup>th</sup> century.

The anthropological investigation spots a man in his late adult life of about 38 years.

His body high was 169 cm, above the average of known late-Slavic men.

Some palaeopathological findings are worth mentioning. There is a longer-survived head injury in the form of an approximately 1 cm long arc-shaped channel caused most probably by an arrow or spear. It is similar to findings to a burial of Wusterhausen of the same time. A second head injury is a 6-7 cm long groove with traces of a beginning healing process, which might be caused by a sword. A directly following impression, around 1 x 1 cm, should be interpreted as a result of blunt force trauma.

It was possible to identify several acquired "muscular stress markers" (MSM) or enthesopathies at the skeleton. They indicate individual behavior, particularly horseback-riding syndrome. A fracture at the 2<sup>nd</sup> rib in the left chest area should be mentioned as well. An iron projectile behind the right ilium did not injure the bone.

## P04 A pauper cemetery at Schwedt on the Oder (Brandenburg/Germany)

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From September 2010 until June 2011 road rehabilitation in three sections was undertaken in Schwedt at the river Oder. The company „Archäologische Ausgrabungen und Bauprojekt Betreuung“ documented 416 graves. Salvage and full documentation was possible only for 342 burials due to a predefined depth. Historical sources indicate the location as the municipal cemetery before the "Vierradener Tor", which served mainly poor people from 1680 to 1868. This is confirmed archaeologically by simple pine coffins without additions and ornaments, lack of grave goods and four burial layers. The cemetery disappeared from the cityscape after conveyance.

Archeological findings are supported by anthropological results. In addition to the high proportion of Inf. I-deceased (29%), the second mortality peak with 31% is not in the mature age group (as shown by comparative series of Brandenburg of the same time), but unusually in the adult age group. This demonstrates no differences between men and women. Furthermore, the buried of this cemetery have a very high disease stress and workload. The following research results were taken into account: the teeth and periodontal tissues (caries, periodontal disease), non-specific stress markers (transverse enamel hypoplasia, Cribra orbitalia) and deficiency diseases (rickets, scurvy) or infectious diseases (sinusitis).

Conclusions on the workload can be drawn by the frequent occurrence of spondylopathies and osteoarthritis. In addition to these widespread diseases in early modern populations rather rare diseases were diagnosed, such as syphilis, cancer or acromegaly.

## P05 Body Mass Index is related to sleep quality and clock gene variants

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**Background and objective:** Obesity and sleep problems are common health problems in the western world. There is suggestive evidence that they might lead to further health problems like diabetes, hypertension etc. This study aimed to unveil relationships between body mass index (BMI), sleep quality and variants of clock genes.

**Subjects and methods:** In 559 Danish twin individuals (28-78 years), body height and weight were measured and BMI (kg/m<sup>2</sup>) was calculated. Sleep quality was determined using the Pittsburgh-Sleep-Quality-Index questionnaire. In 341 twins, DNA was extracted from peripheral blood samples and three single nucleotide polymorphisms within the genes hCLOCK (rs3736544 A/G, rs4580704 C/G) and hARNTL1 (rs7950226 A/G) were analyzed by Sanger sequencing. Chi-square tests were performed. **Results:** With regard to BMI, 46.4% of the individuals were normal weight, 40.4% overweight and 12.0% obese. Poor sleepers (total: 112 individuals) were more frequent among overweight and obese individuals than among normal weight ones ( $P < 0.05$ ).

Obese and overweight participants carried the hCLOCK allele rs3736544 G more frequently than normal weight individuals (92.1% vs. 95.3% vs. 80.5%,  $P = 0.001$ ). They also carried the allele rs4580704 G (92.3% vs. 93.1% vs. 80.4%,  $P = 0.003$ ) more frequently than normal weight persons (36.8% vs. 63.8% vs. 54.4%,  $P = 0.003$ ). There were no significant differences between groups for hARNTL1 allele carriers ( $P > 0.05$ ).

**Conclusion:** Overweight and obesity might contribute to poor sleep quality or vice versa. Being overweight or obese is also associated with two alleles of the hCLOCK gene.

Data suggest a relationship of BMI with both, sleep quality and genetic variants.

## P06 Comparative study of the Tyrolean Iceman and human remains from prehistoric Trentino-Alto Adige

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The Science Museum of Trento houses an anthropological collection of approximately 150 individuals, dating from the Mesolithic, Neolithic, Bronze Age, until the Middle Age. The skeletons were excavated during the last hundred years from various archaeological sites located in the Adige Valley of Trentino - Alto Adige. In a first step, we performed a thorough anthropological and paleopathological analysis of all human remains present in the museum. Additionally, radiocarbon dating of the osteological material was carried out in order to more precisely define the chronological order of the archaeological sites.

We further focused on the individuals dating to the time period of the Iceman to compare their genetic, morphological, morphometric and paleopathological features to those of the Tyrolean Iceman. Out of the 150 skeletons, 44 (8 males, 9 female, 27 non determinable) could be assigned to the Copper Age.

The paleopathological analysis revealed several similar findings compared to the Iceman, including dental pathologies, such as caries, periodontitis and advanced dental abrasion, degenerative diseases of the vertebral column and some evidence of enthesopathies. A morphometric comparison turned out to be difficult due to the high level of fragmentation of the skeletal material.

This work provides new insights into the prehistoric population of Trentino-Alto-Adige, in particular on their ancestry and living and health conditions, at the time of the Iceman.

## P07 Comparison of Sardinian and Peruvian mummies by histological, immunohistochemical and anthropological study

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Following the discovery of two partially mummified corps in a Cathedral of Castelsardo, to better understand the mummification process it was decided to compare them with a Peruvian mummy given to the University of Sassari in the late '800. The aim of this work is to compare tissue conservation status by a morphological study supported by anthropological analysis.

Samples of skin and muscle were taken and rehydrated in Sadison's solution to be subjected to histological and immunohistochemical procedures. To establish sex, death-age and height we worked following classical methods (Ferembach 1980; Uberlaker 1989; Meindl and Lovejoy 1985). Castelsardo's mummies conditions are generally fair, although very variable in different points of the body: the former is male, with death-age between 45-55 years. His height is 171 cm. The latter female, with death-age between 60-67 years. Her height is 157 cm. She shows reduction of some intersomatic spaces, spondyloarthropathy and scoliosis. The muscular and cutaneous tissues show a good conservation, in particular the former presents a fibrillar structure well-preserved, boundaries free between cells.

The Peruvian mummy is male, with death-age older than 25 years. His height is 160 cm. He shows osteophytosis at lumbar area with a collapse of the body at 4th lumbar vertebra; his conditions are overall good however the tissues show a poor conservation where a structural organization cannot be distinguished. This study allowed us to obtain paleo and microanatomy information and to describe the morphological characteristics of mummified tissues.

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Key words: Mummies, anthropology, histology, immunohistochemistry

# P08 Detection of gene flow between Polynesian populations

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**Background and objectives.** Differing reconstructions of initial settlement activities and phylogenies for aboriginal Polynesian island inhabitants suggest multiple migration events and thus multiple phylogenies in Polynesia. The objective of this study was to figure out for which populations such a complex history may be expected.

**Material and methods.** Previous studies showed that within-population diversities of human populations decrease with increasing migratory distance to supposed African origin due to subsequent genetic bottlenecks and founder effects<sup>1,2</sup>. Adjusting the founder population size for the Pacific area, it was possible to predict expected diversities for those populations using continental trend. Analysis was based on frequencies of HLA class I gene variants (420 alleles) from 44 populations (n=7711 individuals). Heterozygosities were calculated as diversity measurements.

**Results.** High determination coefficients for continental populations ( $R^2_{\text{HLA-A}}=0.720$ ,  $R^2_{\text{HLA-B}}=0.718$ ,  $R^2_{\text{HLA-C}}=0.567$ ) indicate that geographic distances could be estimated adequately. For an appropriate founder size concluded from oral traditions, Polynesian populations show higher observed than expected heterozygosities (Wilcoxon test with pooled residuals,  $p=0.029$ ) and higher variance (one-sided Ansari-Bradley test,  $p<0.001$ ) than continental ones. Only the Samoan populations displayed values below expectations.

**Conclusions.** These findings indicate for most Polynesian populations a high amount of admixture with other populations (most probably Polynesians from other islands) and thus multiple migrations inside Polynesian triangle. By contrast, lower values for Samoans suggest additional bottleneck events using that approach. In fact, reduced heterozygosity and conclusion of further bottlenecks for Samoans agrees with recent research<sup>3</sup>.

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## P09 Health and Disease in the Medieval Rural Society of Grevenmacher (Luxembourg)

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The medieval cemetery of Grevenmacher (Luxembourg) was excavated in several campaigns in the years 2003 until 2005 by the Musée National d'Histoire et d'Art Luxembourg. It revealed a great amount of human remains mostly dating from the 13<sup>th</sup> to the early 15<sup>th</sup> century. A comprehensive anthropological examination of these remains was conducted with special interest in the reconstruction of the living conditions of this medieval rural population. The present study includes 371 individuals, 114 of them non-adults. The research questions include paleodemographic analysis as well as metrical and morphological studies. Of special interest were investigations concerning adaptation of bone to activity (enthesal changes) as well as an extensive paleopathological examination focusing on the nutritional status of the population. Particular attention was paid on the study of the non-adult individuals. Mainly features were examined that are in general connected to malnutrition like cribra orbitalia, periostitis, endo- and exocranial lesions but also dental diseases. The analysis of stable isotopes completes the study.

Preliminary results show a rather unusual picture in the rates of specific diseases. In contrast to many other studies of rural populations almost all features examined show low or even very low rates in the Grevenmacher population. This applies to the adult as well as the non-adult individuals. In comparison with other skeletal series with the same sociocultural background, low rates of disease and therefore a relatively good state of health of the population seems to be rather unusual and is therefore an interesting point of discussion.

## P10 Insight into the relationship between modern populations and the Tyrolean Iceman

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After its discovery in the Italian part of the Ötztal Alps in early 90s, numerous archaeological, biochemical and genetic studies have been concerned with the mummified body of the Tyrolean Iceman, an individual who lived in the south ridge of the Alpine area during the Copper Age (about 5,300 y.a). However, some important questions remain unresolved. The key aspect regards the genetic relationships between the Iceman and modern populations. In fact, recent study on the complete genome of the mitochondrial DNA showed that the Iceman belonged to a branch of haplogroup K1 (named K1f or K1ö defined by two specific mutations, the 3513T and 8137T), that has not yet been found in extant populations.

These results suggests that this lineage could be now extinct or very rare.

However, this study was limited by the scarcity of data from modern European populations, especially from the Alpine region of interest. We are analyzing the complete mtdna genome of K lineages (50 samples) from different areas of oriental Alps and collecting all complete K mtdna data available from literature. The genetic data will be analyzed in order to get an updated phylogenetic tree of haplogroup K in Europe and to test the presence of lineage related to the Iceman.

### Acknowledgement:

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# P11 Interdisciplinary Provenance Research on Human Remains of the Colonial Period

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The Charité human remains project, which is funded by DFG until the end of this year, carried out provenance research involving different research disciplines.

In addition to anthropological analyses, which should provide information on age and gender and signs of pathology, historical and ethnological investigations were included to better elucidate the historical provenance. Only non-invasive methods were applied in the anthropological investigations. So far, almost 100 skulls and nearly 20 skeletons were studied anthropologically.

The geographical focus was Australia and Namibia, as Charité had received specific restitution requests from these countries. In a few cases, we succeeded to bring the anthropological findings in direct line with historical and ethnological data and thus to restore the identity of the individual behind the human remains. (Stoecker/Koel-Abt in preparation; Winkelmann in preparation; Koel-Abt/Winkelmann in press).

In most cases, individual data such as age of death and gender could be determined, and also information regarding diet, the general state of health or certain activities, which then allowed a reconstruction of the circumstances of the investigated individuals to some degree, but not personal/historical identification. Our research approach will be demonstrated using two examples from Namibia.

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## P12 Landmark free geometric analysis of the human zygomatic structure

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The zygomatic bone is an important element of the viscerocranium. Several muscles attach here, and its shape has a marked effect on facial appearance. As a consequence, shape variation of the zygomatic bone is crucial in forensic facial reconstruction, reconstructive surgery and evolutionary studies. Shape analysis based on manually placed sparse sets of homologous landmarks is very inaccurate for the zygomatic bone because there are few landmarks that are well-defined and reliable in terms of homology and observer error. For obtaining corresponding coordinates, we applied a surface registration method based on smoothed distortion fields to 200 surface meshes, extracted from CT-scans of Chinese and European origin in order to evaluate population- and gender-specific surface shapes. 8 landmarks provide information for the surface meshes to be coarsely aligned, followed by an enhanced iterative closest point rigid body registration. The aligned surfaces now are iteratively matched onto each other using a locally smoothed displacement vector field (Moshfeghi et al. 1994).

Finally, all surfaces are represented by meshes, consisting of corresponding vertices. Vertices within the region of interest were treated as homologous and processed, using the well-established methods of Geometric Morphometrics (Goodall 1991). Our results show significant shape divergences related to sex and population affinity. Sex differences are hardly distinguishable with the naked eye. A comparison in terms of origin proves the average Chinese shape to be more robust than the European. The variation depending on population affinity concentrates on the orbital border of the zygomatic bone, with less variation at the temporal border.

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## P13 Model-based approaches to plant archaeogenetics

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Model-based approaches to plant archaeogenetics. Computer-based modeling proved to be a useful tool to tackle questions in the field of anthropology, archaeology and genetics (J.M. Diamond, 2002). Many genetic studies have applied the isolation by distance model, which predicts an increase in genetic diversity in negative correlation with geographic distance in order to identify the origin of certain species (Ramachandran 2005; Manica 2007).

Based on this theory, we propose a model of monotonic reduction in diversity with distance from origin, to gain more insight on the geographic origin of a range of plant species. We have applied our method on broomcorn millet ( *Panicum miliaceum* ) microsatellite data and were able to pinpoint the origin of the crop to lie in China in close proximity to Beijing. Furthermore, we were able to determine the approximate spreading of Taro ( *Colocasia esculenta* ) and are in process of utilizing this method for other plant species for which the dispersal pattern remains unknown.

We want to emphasize the great potential of the model, which is able to shed light on indefinite origins of any organism based on genetic variation data and aim to expand the method to be applicable for other types of data such as radiocarbon dating.

## P14 Molecular genetic analysis of Ovis remains excavated at Pre-Pottery Neolithic Asikli Höyük (Central Anatolia, Turkey)

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Worldwide survey of mitochondrial DNA sequence variation in domestic sheep ( *Ovis aries* ) revealed three major lineages, designated as haplogroups A, B and C. Recently, two additional haplogroups, D and E, have been described. Archaeozoological analysis of *Ovis* remains from sites in the northern Fertile Crescent indicates the presence of the domestic form in the Upper Euphrates basin since the second half of the 9th millennium cal. BC. Molecular genetic data of modern breeds support a Near Eastern origin of domestic sheep and suggest three independent domestications. However, in order refining the regions of origin and the spreading of sheep husbandry, DNA analysis of *Ovis* remains from securely dated archaeological contexts in and beyond Anatolia is necessary. In this study, sheep remains excavated in Pre-Pottery Neolithic contexts at Aşıklı Höyük have been investigated.

Aşıklı Höyük is a settlement mound located ca. 25 kilometers south-east of the city of Aksaray in Central Anatolia and is situated at an elevation of ca. 1100 meters above sea level. From an archaeological and archaeozoological viewpoint it is a key site for our understanding of the process of neolithisation in Central Anatolia.

Based on our mtDNA study, it can be concluded that all major haplogroups (A, B and C) are present at Aşıklı Höyük. Haplotypes rarely described or even missing in GenBank have been obtained from this assemblage.

Thus, genetic diversity is high in our sample originating from Level 2 and dating to the first half of the 8th millennium cal. BC. Whereas our findings suggest that Aşıklı Höyük may have been located in the core area of *Ovis* domestication, difficulties arise to ascertain the domestication status of the animals found at Aşıklı Höyük.

# P15 Palaeopathological examination of children's skulls from the late medieval population of the village Diepensee (Brandenburg)

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Prior to the expansion of the Berlin Brandenburg International (BBI) airport, an archaeological investigation was conducted in order to survey and examine the historical village of Diepensee.

In the summer of 2005 during the course of this survey, a medieval cemetery including the remains of the basement of the stone church were unexpectedly discovered.

The cemetery was excavated in its entirety and approximately 500 individuals were documented and exhumed. Most are associated with the settlement period of the village, dating from the end of the 12th until the middle of the 14th century.

A detailed palaeopathological analysis of the excavated individuals was made possible within the framework of the DfG project (German Research Foundation) „Investigations of living conditions, dynamics in settlements and human nutrition in medieval rural settlements in Brandenburg“ under the direction of the Brandenburgisches Landesamt für Denkmalpflege und Archäologisches Landesmuseum. The focus of this work in progress is on the pathological modification of subadult skulls.

The number of subadult skeletons totals 125, of which only 70 had skulls. Cranial bones of these 70 individuals exhibit lesions related to specific and non-specific inflammations and infectious diseases, as well as indications of malnutrition and physiological stress.

Further insight into medieval life in rural Diepensee will be gained by comparing results concerning exposure to illness seen in skeletal series originating in this and other regions.

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## P16 Sexual maturation pattern in the mirror of socioeconomic background

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**Background:** It is evidenced by the auxological surveys, that each healthy child follows along the same pattern of sexual maturation independently from gender or the genetic origin. Nevertheless, the tempo and rate of maturation, as well as the timing and duration of the developmental phases are population-dependent and determined by environmental factors. Socioeconomic conditions play a decisive part as macroclimate in shaping the physical and mental exfoliation of children. The aim of the study was to find out whether essential differences exist in the sexual maturation pattern of Hungarian girls living in the seriously deprived small regions when compared to the Hungarian national references.

**Subjects and methods:** Altogether 711 girls and 790 boys (aged 10-16 years) living in the deprived small regions of Hungary were examined between 2004 and 2007. Subjects' sexual maturity status was compared to the national references. Sexual maturity status in the girls was estimated by the stages of pubic hair, axillary hair and breast development, as well as by the menstrual status; while in the boys by the stages of pubic hair, axillary hair and genitalia development, as well as by the spermarcheal status. The pubertal developmental stages of pubic hair, breast and genitalia were rated according to Tanner's recommendations. The stages of axillary hair were estimated by using Zeller's method. Data on menstrual/spermarcheal status was collected by status-quo method and median age at menarche/spermarche was estimated by probit analysis.

**Results:** The sequence of pubertal maturation events and stages was very similar in pubertal children living in the seriously deprived regions compared to the national references. However, the timing of pubertal development in children from the deprived regions showed a small shift toward older ages compared to the national references. The interval between the median ages of the first and last pubertal stages was similar in the subjects living in deprived and not deprived regions of Hungary.

**Acknowledgement:**

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# P17 Strontium isotope analysis of mice bone extracted from owl pellets: isotopic mapping of Bavaria based on biologically available strontium

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Over the past few decades, the analysis of stable strontium isotopes ( $^{87}\text{Sr}/^{86}\text{Sr}$ -ratio) in mineralized tissues as a tracer for provenance and migration has found broad application.

One of the limitations of this method is the determination of the local strontium signature of the examined region. This local signature is derived from the biologically available strontium which, however, often differs from the signature of the corresponding bedrock.

In our study we create, for the first time, an isotopic map of the 'modern'  $^{87}\text{Sr}/^{86}\text{Sr}$ -ratios of several regions in Bavaria ( Southern Germany ), based on the biologically available strontium.

For this purpose we perform stable isotope analysis on mice bone extracted from owl pellets.

By comparing the results with measured values of archaeological material of selected sites, one could, on one hand, provide new interpretive approaches.

We expect them to include aspects of migration, mobility and provenance of the respective archaeological collective. On the other hand, it will be possible to draw conclusions about the applicability of strontium isotope analyses of archaeological material as a method in archeometry. The map is furthermore intended to serve as a reference for future studies.

## P18 United in death - related by blood? Genetic and archaeometric analyses of skeletal remains from the neolithic earthwork Bruchsal-Aue

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From 1987 to 1993, the State Office for Cultural Heritage Management Baden-Württemberg excavated a Neolithic earthwork of the Michelsberg Culture in Bruchsal, district of Karlsruhe. Although usage as temporary or permanent settlement is indicated by diverse ceramic finds, settlement remains could not be found possibly due to erosion processes. However, the excavators found seven burials with skeletal remains of 17 individuals, including a multiple burial with nine individuals.

The collective was buried in a peculiar manner: six infants were laid semi-circularly around two adult men; a seventh infant was secondarily buried atop. None of the individuals showed any evidence for the circumstances of death. The anthropological diagnosis suggested that the individuals are related among each other, since they show similar anatomical variants like identical tooth displacements in both adults. We now investigated this hypothesis with molecular genetic kinship analysis via mitochondrial haplogroup classification and STR analysis of the nine collectively buried and three more individuals from this site. Additionally, we performed strontium and oxygen isotope analyses to elucidate possible migration movements, which in combination with mtDNA data could help to reconstruct the fate of this community. Also, we collected nitrogen and carbon isotope data to get new insights into nutrition and life style of the Michelsberg population.

## P19 Walking the Black Dog: Should depressive patients travel?

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The enormous mobility of *Homo sapiens* is unique among primates and a determining human feature. It is realized and reflected in modern mass tourism. Another mass phenomenon - at least of the modern world - is depressive disorder. Winston Churchill, who suffered from spells of depression all his life called this unwelcome companion the Black Dog.

Since depressive persons also travel, both mass phenomena overlap. Considering this, questions arise: Should people suffering from depression travel? No, at least not during stages of high severity says an experienced psychiatrist.

Depressive persons can find themselves more uncomfortable and even suicidal in a new environment (Möller 2006, personal communication). Sufficient research seems to be lacking. Therefore we conducted an inquiry on whether depressive patients should travel or not within the therapy concept by sending a structured questionnaire to Berlin psychiatrists. The questionnaire was completed by 29 psychiatrists. To our surprise, a mainly positive effect of travelling during the therapy was considered. This judgment however was restricted to a limited length of the journey of ten days at maximum. Furthermore, it did not apply for suicidal patients or those in a severe phase.

## P20 When genetics plays as historical tool: traces of forgotten events in mountain areas of Central Italy

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The genetic structure of human populations reflects the history of migrations and its study could highlight historical events. The genetic analysis of small communities allows to identify their genetic background and to reconstruct putative founder events, also through cultural and archeological disciplines. In this study the paternal and maternal genetic history of seven mountain villages, scattered throughout Central Italy, are reported.

This study might represent a useful model to achieve information of the ancient people lived in pre-Roman times. The communities were selected because of their evident geographic isolation, that resulted in biodemographic stability since Roman conquest.

We analyzed 347 individuals for mtDNA, in particular HVS I and HVS II D-loop hypervariable regions and informative SNPs within the coding region, and 237 males for Y chromosome STRs. All the mtDNA and Y chromosome haplogroups are mainly of Western Eurasian origin, but there are some typical of Near East. One village, Jenne (Rome), shows U2d and Q haplogroups for mtDNA and Y chromosome respectively that are absent in all the other communities. The finding of these haplogroups could suggest a forgotten historical migration coming from Western Asia. This particular genetic signature could be retained probably because of the mountain features of this area, which might have limited the gene flow with Italian and other Mediterranean populations. Grant sponsor: MIUR–PRIN; Grant number: n. prot. 2008B4J2HS allotted to O.R.

## P21 Wildlife forensics: preservation of a possible capercaillie habitat

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Stable isotope analysis is a broadly used tool for various ecological and archaeological questions in research. Based on ecological studies on migratory animals for example, the provenance identification of a certain sample became very important in the presented study. In this case, the isotopic systems of strontium and oxygen were the method of choice. Not only are there unidentified human individuals in forensics that are subject to provenance analyses. For ecological reasons, those kinds of studies are necessary in order to sustain conservation policies, especially when there are species threatened or at risk of extinction.

The capercaillie ( *Tetrao urogallus* ) is an emblematic species of the European forest that has been banished from many parts of its former territory due to environmental changes and anthropogenic pressures. Applying strontium and oxygen stable isotope analyses to the remains of a capercaillie found dead north of Nuremberg should localize possible remnant populations in the South of Germany, where it is considered extinct.

The isotopic signature of bone and feather showed values different from the signature of the region. Nevertheless, the obtained data were comparable with isotopic signatures of other areas within the distribution range of *Tetrao urogallus*. The isotopic ratios of both the feather and bone from the capercaillie wing showed the same isotopic signature. This means that the bird had lived in one region for a longer period and has not migrated recently.

The data obtained from the bioavailable strontium in this research and the  $\delta^{18}\text{O}$  estimated for the area do not allow us to conclude that the *Tetrao urogallus* individual found north of Nuremberg actually resided in that area. Due to the geological heterogeneity and low resolution of the sample collection procedure, more analyses from the bioavailable strontium are needed in order to characterize the area better.

## P22 Women and arms in the early medieval times: Morphological and molecular biological sex determination in archaeological/ anthropological diverging cases

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Burials in linear cemeteries from Merovingian times (5<sup>th</sup> to 8<sup>th</sup> century), with often extensive grave goods, offer numerous opportunities to analyze the ancient social structures and conditions. In the last couple of years, the interest in the role of age, sex and gender and other important social factors (religion, profession, law), which can be derived from grave objects, grew. From the arrangement of grave goods characteristic for juvenile, adult, mature and senile individuals, the age-dependent social roles of men and women can be concluded and their daily life might become more understandable. The collections of early medieval burial sites in Europe and especially Bavaria show a strong pattern concerning the composition of sex-specific grave goods. Female burials are mostly associated with jewellery and male graves with armament. Yet, few burials with contradicting findings exist. In these cases the grave furniture indicates a different sexual belonging than the anthropological examination. Women are found with arms and men with jewellery and ornaments.

To determine the deceased's sex is essential for further analyses. In recent research more emphasis was placed on archaeological findings than anthropological data although these might yield information for further distinctions.

To solve several of the few archaeological / anthropological diverging cases a real-time PCR method based on differently fluorescently labeled DNA probes for the sex-specific alleles of the Amelogenin gene, based on the protocol of Alonso and Martín (2004), was established. In addition a more detailed morphological examination of the skeletons was carried out, and the methodological standards were extended.

## P23 Yes we can! Data sharing close to 100% in ancient human DNA studies

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Data sharing and its importance for research progress is one of the topics at the centre of the current scientific debate. While showing an increasing attention to this subject, the scientific community is becoming aware of the fact that data sharing is an ambitious target yet to be achieved rather than a starting point for scientific development. Research concerning human genetic variation could be taken as a forerunner in the establishment of widespread sharing of primary datasets due to codified nature of genetic information, the relative simplicity of metadata and the availability of infrastructures for permanent data storage.

Despite these premises, a substantial portion of datasets (21.9%) regarding mtDNA and Y chromosome polymorphisms of extant human populations was found to have been withheld. Ethical issues (e.g. risk of privacy violation) may be an important reason behind the incomplete sharing.

Here we present the results of an investigation on sharing behaviour in human ancient DNA studies. We scrutinized a total of 140 papers, containing mtDNA, Y chromosome and autosomal ancient DNA data, indexed in the Pubmed database from 1988 to 2012 using an ad hoc developed procedure. Our analysis shows that more than 99% of primary datasets are available, suggesting that ancient human DNA may be a flagship research field for data sharing. The weight of various factors (e.g. editorial and granting policies, awareness of reproducibility importance and lack of ethical issues) for this sharing behavior was investigated by a questionnaire-based survey.

## P24 Young and older healthy women differ in their sleep timing and cortisol concentration after awakening, but not in their sleep structure

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**Background and objective:** Ageing is associated with changes in hormonal rhythms and poorer subjective sleep quality. Since most data refer to geriatric populations, this study aimed to analyse whether healthy older women differ from young women in sleep timing, sleep structure, and related cortisol concentrations after awakening.

**Subjects and methods:** Participants were 13 young ( $26.8 \pm 4.0$  yrs) and 23 older ( $68.4 \pm 5.2$  yrs) healthy, non-smoking independently living women. Their health state was recorded by medical history. Sleep quality and timing were determined by the Pittsburgh-Sleep-Quality-Index (PSQI).

Sleep structure was recorded with ambulant electroencephalography (EEG).

Participants collected saliva samples immediately after awakening. Cortisol concentrations in the samples were analyzed by enzyme-linked immunosorbent assay. Group comparisons were performed by u-tests or independent samples' t-tests.

**Results:** According to PSQI, older women displayed poorer sleep quality than young women ( $p < 0.001$ ), slept shorter ( $p < 0.001$ ), and got up earlier ( $p < 0.01$ ).

Earlier wakeup time by subjective PSQI was confirmed by objective EEG ( $p < 0.05$ ). No differences in sleep structure (e.g. percentage of delta sleep) were observed between older and young women. Older women showed higher cortisol concentrations after awakening than young women ( $p < 0.05$ ).

**Conclusions:** Results suggest that earlier awakening in older women may be caused by higher concentrations of the stress hormone cortisol. By contrast, the cortisol concentrations do not seem to influence the sleep structure in older women. Changes in sleep structure are often described for collectives with age-related health problems. This was not the case for the participants of this study who showed a good health state.

## P25 Histological investigation of human mummified remains - assets and drawbacks in the analysis of ancient tissue material

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Histology, the microscopic study of differentially stained tissue sections has become an essential tool in various biological and medical scientific fields. The application of this valuable technique ranges from basic tissue typing and pathological diagnostics to the identification of trace elements in the sample such as iron or calcium. Like other techniques in medicine also tissue histology made its way into mummy research being a useful tool to determine the degree of tissue conservation and to identify possible pathological changes. However, compared to modern tissue material ancient specimens require special re-hydration steps before paraffin embedding and often display different staining characteristics. Based on a study of Mekota and Vermehren (2005) we re-investigated different re-hydration solutions with skin tissue samples from different mummy types. Results indicate a high variability of the re-hydration methods in terms of re-hydration efficiency, preservation of tissue details and staining characteristics.

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# P26 Morbidity Reconstruction of Late Roman Migrants - A Palaeopathological Contribution to Prehistoric Migration Research.

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Migration is described as a *conditio humana* and basic adaption mechanism in human evolution. Since ratios of  $\text{Sr}^{87}/\text{Sr}^{86}$  indicate the geological provenience of individuals, new options for the investigation of prehistoric migrants as acting subjects of migration are available. Despite of partially contradictory results, recent studies on the relation of health and migration show global trends and deviating health patterns between migrants and locals, like higher prevalence of infectious and degenerative joint disease and worse oral health in migrants. On this basis, in archeology, the hypothesis emerged that immigrants have a significantly higher prevalence of illness than locals. In this palaeoepidemiological study, relations of prehistoric migration and health are investigated by the example of the two late Roman burial sites Neuburg/Donau Seminargarten (Bavaria) and Keszthely-Fenekpuszta (Hungary). Life expectancy, body height, cribra orbitalia and cranii, periosteal reactions, degenerative joint disease, dental health and trauma have been investigated with due consideration of preservation. Preliminary results show that the influence of migration on general health is very low. But concerning specific markers such as periosteal lesions or trauma significant different patterns of morbidity between migrants and locals are obvious. Additionally, migrants had a higher average life expectancy. The results are partly congruent with recent socio-medical research. Positive correlations of migration and health can be explained by positive selection of young and healthy individuals by migration (“healthy-migrant-effect”), negative ones by an increase of physical and mental stress due to the migration processes and predominantly lower social positions of migrants within host communities.

## P27 Results and hypotheses on living standards from stature estimation on a medieval population from Disentis/Muster (GR)

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The present study examines a medieval population from Disentis / Mustér, a village in the eastern Swiss Alps. The medieval cemetery was found next to the monastery, which dates from the 8th century. The cemetery was in use from the 11th to 13th century.

50 males, 24 females, 12 indeterminate individuals and 22 sub-adults were identified by standardized anthropological methods (Feremach 1979, Murail et al. 2005). Stature estimation (Pearson 1899) revealed a population of high stature (men 167,7 ±3,8 cm, women 158,6 ±6,1 cm) compared to other chronologically similar Alpine populations from Graubünden (CH) (Papageorgopoulou 2008). Especially the women exhibit the most marked differences. Additionally, the number of pathologies like e.g. dental enamel hypoplasia (men 11%, women 8%), Cribra orbitalia (n = 1), porotic hyperostosis (n = 2) were decreased compared to the other populations.

These findings indicate a generally good health status for that time period. We assume based also on historical information that a socially and economically strong population was buried next to the convent and its regional important relic. We hypothesize, that this population could have profited from a high protein diet, based on alpine dairy and cattle farming.

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## P28 A hellenic grave of the geometrical period. Social Status and Disease.

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The findings of a human skeleton are presented. Chronologically they are placed to the late geometrical period (650-635 b. Chr.). The excavation took place until the end of 2004. During the opening of the Kymis street in the region of Charnai/Athens a new geometrical grave was found, without any stone covers above. The individual was laying on the back, turning the legs to the left side. It was a rich grave, with 11 ceramic vessels inside. Especially the skull was affected of superficial post-oral erosion. Mostly the characteristics belong to a female individual, although the age definition is still not clear. Presented are -the skull as a conglomerate with cervical vertebrae, stones and plant roots. The distinction of the single parts seems to be difficult because of the fragility of the structures -the right mandibula half shows an organized process with small vessels impressions - fragments of long bones (Femur R/L, Humerus R/L, Radius R, Ulna R) seem affected of an intravital process, doing deep grooves, rough superficial appositions and thicker corticalis. A systematic disease or a hematogenous metastatic process can be supposed -parts of the pelvis and 2 fragments of ribs are not affected. This individual could have a special social position in this period, and the combination with the systematic long bone disease makes the further radiological and histopathological examination necessary.

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