3rd International Conference on

PHARMACY AND MEDICINE
IN ANCIENT EGYPT

Barcelona, October 25th-26th 2018

http://www.egypharmed2018.com
Welcome .............................................................. 3
Committees
  Scientific Committee .............................................. 4
  Organizing Committee ........................................... 5
Programme ............................................................ 6
1st Session
  Medicine in Ancient Egypt ...................................... 13
2nd Session
  Pharmacy and Vet in Ancient Egypt ......................... 21
3rd Session
  Palaeopathological diagnosis and New techniques applied to the study of human remains ........................................ 26
Posters ........................................................................ 33
4th Session
  Mummification and Variations ................................. 37

http://www.egypharmed2018.com
Welcome

On behalf of the Organizing and Scientific Committees, we are pleased to invite you to attend the Third International Conference on Pharmacy and Medicine in Ancient Egypt to be held in Barcelona on October 25th and 26th 2018.

Following a First Conference on Pharmacy and Medicine in Ancient Egypt in Cairo (Egypt) in 2007 and a Second International Conference on Pharmacy and Medicine in Ancient Egypt held in Manchester (UK) in 2008, the next conference was going to be held in Aswan in 2012. Nevertheless, for extra academic reasons could not be materialized.

We are highly honoured to organize this new conference and continuing with the one organized some years ago for the study and presentation of new research advances in these topics.

This meeting will display most recent Pharmaceutical and Medical studies on human remains and organic and plant material from ancient Egypt, together with discussions on textual and iconographical evidences related to this subject to evaluate the knowledge and advance on the Pharmacy, Veterinary and Medicine in Ancient Egypt.

The Conference program combines plenary sessions, oral communications and posters, and discussions which will permit to establish interdisciplinary collaborations between researchers and research groups that propose breakthrough studies on Pharmacy and Medicine Antiquity.

We are looking forward to seeing you in Barcelona in 2018 and to enjoy the Conference and our lovely Mediterranean city.

http://www.egypharmed2018.com
Committees

Scientific Committee

Honorary President:
Professor Rosalie David
Emeritus Professor of Egyptology at The University of Manchester (UK).

President:
Dr. Miguel Sánchez
Chief of Pathology and Medical Director of the Leslie Simon Breast Care and Cytodiagnosis Center at Englewood Hospital and Medical Center (USA).

Vice-president:
Prof. SalimaIkram
Distinguished Professor of Egyptology at the American University in Cairo (Egypt) and Invited Professor at Yale University (USA).

Vocals:
Prof. Eva-Maria Geigl
Co-director of the Epigenome and paleogenome lab of the Institut Jacques Monod, University Paris-Diderot (Paris 7)/CNRS in Paris (France). In recent studies, Prof. Geigl and her team have demonstrated that the Ancient Egyptians were first to domesticate the cats.

Dr. Jesús Herrerín López
PhD in Biological Sciences. Associate Professor of Biology at the Autonomous University of Madrid (Spain). Member of the archaeological teams at the Theban Tombs 16, 34, 110, 11 and 12 and the Projects Djehuty and Hery.

Dr. Albert Isidro
MD.PhD. Consultant Orthopedist from Hospital Universitari Sagrat Cor in Barcelona. Aggregate Professor in Medicine of the University of Barcelona. Paleopathologist of the Egyptian Museum of Barcelona. Advanced Research Membership of the Physical Anthropology of the Autonomous University of Barcelona. Member of the archaeological teams of Sharuna and Qarara Necropolis (Middle Egypt) and Thutmosis III Project in Western Thebes (Upper Egypt).

Prof. Frank Rühl
Professor Director of the Institute of Evolutionary Medicine of the Faculty of Medicine at the University of Zurich (Switzerland). Director of the Swiss Mummy Project.

Prof. Lisa Sabbahy
PhD in Egyptian archaeology from the University of Toronto (Canada) and former Professor at the University of California-Berkeley (USA).
Professor of Egyptology at the American University in Cairo (Egypt) and Program Director of the MA in Egyptology and Captology at AUC.

Prof. Sahar Saleem
Professor of Radiology at Kasr Al-Ainy Faculty of Medicine of the Cairo University (Egypt). Leading member of Egyptian Mummy Project - Egypt.

http://www.egypharmed2018.com
Committees

Organizing Committee

Dr. Rosa Dinarès Solà
MD specialist in radiology (1980) by the Autonomous University of Barcelona, MA in Egyptology (2000) by the Autonomous University of Barcelona. Team member of the research expeditions at the Theban tombs TT16 and TT34. Currently involved as radiologist and paleopathologist at TT16 tomb at Western Thebes, Luxor, in the University of Memphis Mission to Theban Tomb 16 (Panehsy) project “TT16: The tomb of Panehsy in Dra Abu el Naga” directed by Dr. Suzanne Onstine [http://blogs.memphis.edu/suzanneonstine/]. Dr. Dinarès works as radiologist at the General University Hospital of Catalonia - Quirónsalud Group. Prize of professional excellence given by the Medical School of Barcelona (2014).

Dr. Mikel Fernández Georges
BSc in Biology (1990) and BA in Linguistics (2005) by the Barcelona University, MA in Egyptology (1999) by the Autonomous University of Barcelona, and PhD in Linguistics by the University of Barcelona (2015) entitled “Population and order of constituents”. Dr. Fernández works as professor at the Institut Banús de Cerdanyola.

Dr. Maria Rosa Guasch Jané
BSc (1996) in Pharmacy, MSc in Nutrition and Food Science (1998) and PhD in Pharmacy (2005) by the University of Barcelona, entitled “Wine in Ancient Egypt: a cultural and analytical study”. She is also MA in Egyptology (2000) by the Autonomous University of Barcelona. Dr. Guasch is director of the research project “Study of viticulture and winemaking in Egyptian tombs” research project (2011-2014) and the “Irep en Kemet”, Wine of Ancient Egypt, research project [www.wineofancientegypt.com]. Currently, she is post-doctoral researcher Marie Sklodowska-Curie EGYWINE project (2016-2018), funded by the European Commission (MSCA-IF-2015), at Mondes Pharaoniques (UMR 8167 ‘Orient et Méditerranée’), directed by Professor Pierre Tallet, of the Paris-Sorbonne University (France). The EGYWINE project studies the ancient Egyptian wine jars, and grapes and wine samples through paleogenomics.

http://www.egypharmed2018.com
Programme
# PROGRAMME

**Thursday, 25th OCTOBER**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:00-09:30h</td>
<td>Registration</td>
</tr>
<tr>
<td>09:30-10:00h</td>
<td>Opening</td>
</tr>
</tbody>
</table>
| 10:00-10:45h  | **Keynote speaker:** Professor Rosalie David, University of Manchester (UK)  
                 *“Epidemics and their aftermath in Ancient Egypt”*        |
| 10:45-11:00h  | Break                                                                    |
| 11:00-13:20h  | **Communications**                                                       |
| 11:00-11:20h  | HEART AND VASCULAR DISEASES IN ANCIENT EGYPTIAN MEDICAL TEXTS AND THE STUDY OF THE MUMMIES. Györy Hedvig |
| 11:20-11:40h  | HEALING AND MEDICAL PRACTICE IN ANCIENT EGYPT, OR: WHAT CAN BE DONE IN FOUR DAYS?. Di Biase-Dyson Camilla; Schultz Michael; Nina Wagenknecht |
| 11:40-12:00h  | THE TEXTS OF UNAS’S PYRAMID OR SECOND BIRTH TO ETERNITY. Elisabeth Monlouis; Jean christophe Combaz |
| 12:00-12:20h  | BONE IDENTIFICATION AND ANGULOMETRY OF THE FOOT AND ANKLE IN EGYPT’S MUMMIES. Rodríguez Corbera Patricia; Martinez-Escauri-za Pablo; Torrent Pérez Berta; Dinarès Solà Rosa; Herrerín López Jesús |
| 12:20-12:40h  | A DOCTOR’S HANDWRITING. PRELIMINARY REMARKS ON THE SHORT-HAND OF RECIPE-Writing IN ANCIENT EGYPTIAN MEDICAL TEXTS. Di Biase-Dyson Camilla; Glöckner Melanie |
| 12:40-13:00h  | HEALING WOMEN’S BLEEDINGS IN ANCIENT EGYPT: THE LONDON MEDICAL PAPYRUS. Santos Jessica Alexandra Monteiro |
| 13:00-13:20h  | THE PURE PRIEST OF SEKHMET, BETWEEN HEALTH AND DISEASE. Torras-Benezet Núria |
| 13:30-15:00h  | Break                                                                    |

**Session chair:** Dr. Maria Rosa Guasch-Jané, director of the Wine of Ancient Egypt/EGYWINE Project (Catalonia)
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>15:00-15:30h</td>
<td><strong>Keynote speaker:</strong> Professor Salima Ikram, American University in Cairo (Egypt)</td>
</tr>
<tr>
<td></td>
<td>“Images and analyses: Recent advances in mummy studies”</td>
</tr>
<tr>
<td>15:30-16:00h</td>
<td>★ <strong>Special communication:</strong> Professor Lisa Sabbahy, American University in Cairo (Egypt)</td>
</tr>
<tr>
<td></td>
<td>“An update on our understanding of disease in Ancient Egypt”</td>
</tr>
<tr>
<td></td>
<td><strong>Session chair:</strong> Professor Salima Ikram, American University in Cairo (Egypt)</td>
</tr>
</tbody>
</table>

### 2nd Session: Pharmacy and Vet in Ancient Egypt

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>16:00-17:20h</td>
<td><strong>Communications</strong></td>
</tr>
<tr>
<td>16:00-16:20h</td>
<td>A NEW PROPOSAL FOR THE IDENTIFICATION OF THE ITRW-PLANT IN THE BROOKLYN PAPYRUS 47.218.48/85. Boccio Maravillas</td>
</tr>
<tr>
<td>16:20-16:40h</td>
<td>AN APPROACH TO TRANSLATING SHRT AND DJARET. COMPARED METHODS. Gaya Montserrat Mercè</td>
</tr>
<tr>
<td>16:40-17:00h</td>
<td>THE REMEDIES IN COPTIC MEDICINE. Sawy Mona</td>
</tr>
<tr>
<td>17:00-17:20h</td>
<td>A CASE FOR DISEASE CONTROL IN CAPTURED BIRDS USING HYENA SALIVA?. Park Rosalind</td>
</tr>
<tr>
<td>17:20-17:50h</td>
<td><strong>Keynote speaker:</strong> Professor Eva-Maria Geigl, Institut Jacques Monod, Paris (France)</td>
</tr>
<tr>
<td></td>
<td>“An Egyptian cat tale told by ancient DNA?”</td>
</tr>
</tbody>
</table>
**Friday, 26th OCTOBER**

**Session chair:** Professor Frank Rühli, University of Zürich (Switzerland)

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:15-10:00h</td>
<td><strong>Keynote speaker:</strong> Sahar Saleem, Cairo University (Egypt)</td>
</tr>
<tr>
<td></td>
<td>“Ancient Egyptian medicine and health in the eyes of modern science”</td>
</tr>
</tbody>
</table>

### 3rd Session: Palaeopathological diagnosis and New techniques applied to the study of human remains

<table>
<thead>
<tr>
<th>Time</th>
<th>Communications</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00-10:40h</td>
<td><strong>TOMOGRAPHIC IMAGING UNDER FIELD CONDITIONS USING PORTABLE DIGITAL PLANAR X-RAY EQUIPMENT.</strong> Eppenberger Patrick; Seiler Roger; Rühli Frank</td>
</tr>
<tr>
<td>10:00-10:20h</td>
<td><strong>PALÉOPATHOLOGIE D’UNE POPULATION ANTIQUE. L’OASIS DE KHARGA AUX ÉPOQUES PTOLÉMAÏQUE ET ROMAINE.</strong> Lichtenberg Roger</td>
</tr>
<tr>
<td>10:40-11:10h</td>
<td>Break</td>
</tr>
</tbody>
</table>

**Session chair:** Professor Rosalie David, University of Manchester (UK)

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:10-11:50h</td>
<td><strong>Keynote speaker:</strong> Frank Rühli, University of Zürich (Switzerland)</td>
</tr>
<tr>
<td></td>
<td>“Biomedical research on ancient Egyptian mummies: General perspectives and latest findings in the Valley of the Kings (KV 31, KV 40, KV 64) and Sheikh Abd el-Qurna (TT95)”</td>
</tr>
<tr>
<td>11:50-13:00h</td>
<td><strong>Communications</strong></td>
</tr>
<tr>
<td>11:50-12:10h</td>
<td><strong>THE INCIDENCE OF PRE-MORTEM TRAUMA IN ANCIENT EGYPTIAN Mummies. CT SCAN EVIDENCE.</strong> Loynes Robert</td>
</tr>
<tr>
<td>12:10-12:30h</td>
<td><strong>AN ORTHOPAEDIC ENIGMA. WHAT CAN DISMUTENIBTES TELL US ABOUT ORTHOPAEDIC PATHOLOGY?.</strong> Loynes Robert Habu Anne</td>
</tr>
<tr>
<td>12:30-12:50h</td>
<td><strong>THE CANOPIC JAR PROJECT: INTERDISCIPLINARY ANALYSES OF ANCIENT HUMAN SOFT TISSUES.</strong> Rayo Blasco Enrique; Brockbals Lana; Kramer Thomas; Galassi Francesco; Habicht Michael; Eppenberger Patrick; Rühli Frank</td>
</tr>
<tr>
<td>Time</td>
<td>Session Title</td>
</tr>
<tr>
<td>--------------------</td>
<td>-------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>10:00-10:30h</td>
<td><strong>Poster session</strong></td>
</tr>
<tr>
<td>10:00-10:10h</td>
<td>ANALYSIS OF THE MINERALS USED IN THE OCULAR REMEDIES IN ANCIENT EGYPT. Argiles Sans Marc; Sabi Dolz Roger; Marques Calvo Marisol</td>
</tr>
<tr>
<td>10:10-10:20h</td>
<td>MUMMIES OF ANCIENT EGYPT FROM THE NEW KINGDOM TO THE ROMAN PERIOD. Szvák Eniko; Szikossy Ildikó; Sklánitz Antal; János István; Kertész Zsófia; Molnár Mihály; Szeniczey Tamás; Baranyai Edina; Pabeschtz Virág; Pálfi György; Pap Ildikó; Györy Hedvig</td>
</tr>
<tr>
<td>10:20-10:30h</td>
<td>A MUMMIFIED HEART FROM A MUMMIFICATION DEPOSIT OF THE MIDDLE KINGDOM. Carrillo-Rodríguez Manuel F; Dorado-Fernández Enrique; Morales Antonio J.</td>
</tr>
<tr>
<td>10:30-12:00h</td>
<td><strong>Break</strong></td>
</tr>
<tr>
<td>13:00-15:00h</td>
<td><strong>Session chair:</strong> Professor Sahar Saleem, Cairo University (Egypt)</td>
</tr>
<tr>
<td>13:00-13:10h</td>
<td>★ Special communication: Dr. Albert Isidro, University Hospital Sagrat Cor (Catalonia)</td>
</tr>
<tr>
<td></td>
<td>“Bone cancer in Ancient Egypt. State of Art”</td>
</tr>
<tr>
<td>13:30-15:00h</td>
<td><strong>4th session: Mummification and Variations</strong></td>
</tr>
<tr>
<td>13:30-13:50h</td>
<td>Communications</td>
</tr>
<tr>
<td>13:30-13:50h</td>
<td>APPLICATION OF OILS AND RESINS DURING THE PROCESS OF MUMMIFICATION: EXPERIMENTAL ANALYSIS AND STUDY PROBLEMS. García Jiménez Laura</td>
</tr>
<tr>
<td>13:50-14:10h</td>
<td>EXPERIMENTAL MUMMIFICATION USING HERODOTUS DESCRIPTION - A 7-YEAR LONGTERM EXPERIENCE OF A HUMAN-SIZED ANIMAL MODEL. Andreas Nerlich; Röcker Pascale</td>
</tr>
<tr>
<td>14:10-14:30h</td>
<td>EXCAVATIONS AT THE SOUTH TOMBS CEMETERY OF AMARNA. Emma González</td>
</tr>
<tr>
<td>14:30-14:50h</td>
<td>★ Special communication: Dr. Jesús Herrerín, Autonomous University of Madrid (Spain)</td>
</tr>
<tr>
<td></td>
<td>“New light on the mummification process: attempts to improve the body for the afterlife”.</td>
</tr>
<tr>
<td>14:50-15:10h</td>
<td>★ Special communication: Dr. Rosa Dinarès, University Hospital General of Catalonia (Catalonia)</td>
</tr>
<tr>
<td></td>
<td>“Ebers and Edwin Smith papyri compared to paleopathological data found in bones and mummified remains”.</td>
</tr>
<tr>
<td>15:10-17:00h</td>
<td><strong>Conclusions</strong></td>
</tr>
</tbody>
</table>
### Additional Activities

#### Wednesday, 24th OCTOBER

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>19:00h</td>
<td>Guided tour in the Egyptian Museum of Barcelona for conference attendees.</td>
<td>Valencia street, 284 - 08007 Barcelona (Spain).</td>
</tr>
</tbody>
</table>

#### Thursday, 25th OCTOBER

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>19:00h</td>
<td>Visit to the Medieval Hospital of Santa Creu (14th century).</td>
<td>Carrer de l’Hospital, 56, 08001 Barcelona</td>
</tr>
<tr>
<td>21:00h</td>
<td><strong>GALA DINNER: Senyor Parellada Restaurant</strong></td>
<td>Argenteria Street 37, 08003 Barcelona</td>
</tr>
<tr>
<td></td>
<td>How to get to the restaurant by metro from the Alimara Hotel (Venue):</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Take metro at Mundet station (L3 Green colour) which is located near the Alimara hotel. Get off at Passeig de Gràcia stop and change to line 4 (L4 yellow colour). Take the metro yellow line towards La Pau and get off at the Jaime I stop, walk 1 minute to the restaurant.</td>
<td></td>
</tr>
</tbody>
</table>

#### Saturday, 27th OCTOBER

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00h</td>
<td>Route to the unedited sites of the Roman city.</td>
<td>Plaça de la Vila de Madrid, s/n, 08002 Barcelona</td>
</tr>
</tbody>
</table>
USEFUL INFORMATION:

🚗 **TAXI SERVICE:** +34 933 033 033

📞 **TECHNICAL SECRETARIAT:** +34 933 633 954

 Emerald **METRO NEAR THE VENUE HOTEL ALIMARA:** Mundet station. L3 (line 3) green color.

Red **ALIMARA HOTEL MAP:** Medes room. Located on the left of the garden.
1st session

Medicine in Ancient Egypt
Ancient Egyptian medical sources often mention various symptoms concerning the state of the heart and their conception of the circulatory system. They display even a discourse (Eb854-855) how the body was maintained through the net of the metu, while another discourse – known from two different sources (Eb856, Bln13) - explains the pathological mechanism of the heart and the metu-net in certain very dangerous cases. It also gives prescriptions for the treatment. Some of the features here appear also in other prescriptions, dealing with the jb and HAty heart disorders.

On the other hand, the results of more and more mummy studies are published where signs of different alterations, insufficiencies or diseases can be recognized or suspected. The lecture will concentrate on connections of these features and the ancient Egyptian theoretical knowledge of medical sciences together with the practical treatments. Some ancient and modern ethnomedical comparison will also be given, together with a few explanations.

Keywords: heart, vascular system, papyri, mummy, medication
HEALING AND MEDICAL PRACTICE IN ANCIENT EGYPT,
OR: WHAT CAN BE DONE IN FOUR DAYS?

C. Di Biase-Dyson¹, M. Schultz², N. Wagenknecht¹

¹ Georg-August-Universität Göttingen, Institute for Egyptology and Coptic Studies,
Heinrich-Düker-Weg 14, 37073 Göttingen,
cdibias@uni-goettingen.de
² Georg-August-Universität Göttingen, Zentrum 1 Anatomie, Kreuzbergring 36, 37075 Göttingen

This paper considers the cases in ancient Egyptian medical texts – particularly recipes – in which a time frame is specified. It posits some hypotheses about what information these time frames can give us about Egyptian conceptualisations of healing processes. We will start with a general overview of the kinds of time frames recorded in the medical corpus [1] and present two case studies based on our empirical study of all medical texts from the pharaonic period (see Figure 1, which depicts the interface of our database). The first case study will consider the time frames in one whole papyrus, namely Papyrus Hearst, which presents very little variation, being comprised almost exclusively of references to ‘four days’. We will look into a few examples from Hearst and consider, with reference to modern insights into healing processes, the range of diseases expected to be able to be healed (or is that treated?) in four days. Does this timeframe have any link to healing processes in the real world? Or do four days represent in a figurative way a general time period for healing? The second case study will analyse the time frames other than four days (which surprisingly comprise almost a quarter of the medical text corpus) and consider possible reasons for this variation in healing periods. In this way, we will provide some insights into this heretofore neglected aspect of ancient Egyptian medical texts.

Keywords: Medical texts, healing, medicine

References

Figure 1. An entry in the database for pHearst 29
2350 years before our time, Unas passed away. His mummy was placed in his pyramid’s chamber. The three portcullises in the gallery fall. Unas and the first “Pyramid Texts” became thereafter inaccessible to the world of humans.

The hope for a form of survival through a return to the maternal womb probably came into being extremely early in the history of human development. Then, the belief in a life-death-rebirth cycle has been carved on to the interior walls of royal pyramids. Indeed, these first texts associate funerary rituals with fundamental knowledge describing the second birth of the Pharaoh. The description of this posthumous pathway incorporates specific medical knowledge, although this is never clearly stated as such.

This presentation shows that the study and translation of these first Pyramid Texts provide a key interpretative contribution by showing how the rebirth of the sovereign occurs via a real birth, described in all its mechanical aspects. Bearing in mind the initial notion of regressus ad uterum, the giving birth phases are described thanks to equivalences which, associated with relevant determinatives which will be less specific in the following texts, give shape to hints that help “solving the enigma”.

The purpose of this work is to outline all the steps of the king’s birth, using the translation of the corpus and its localisation into the tomb as a basis. The chronological unfolding of the birth phases, as recounted and the symbolism inside the tomb show how the pyramid becomes like a “machine matrix” propelling the spirit of the king toward the celestial sphere in a perfect description of a medical and spiritual “re-birth”.

**Keywords:** pyramid texts, second birth, regressus ad uterum, birth phases
Introduction: The ancient Egyptian culture specialized in the art of medicine, being able to perfect the techniques of mummification. Mummified bodies reproduce the appearance of the living, but their internal structures are retracted. Podiatry, a science that was born in ancient Egypt, can provide their knowledge to study changes in the structure of the foot and ankle after mummification.

Materials and Methods: Nine cases of mummified lower extremities (LE) were analyzed. The different bones were identified and the stature of six of the individuals was studied, as well as the age of one of them. Different angles of the foot and ankle were assessed, and a pathological diagnostic study was carried out.

Results: Of the cases analyzed, 100% of the rearfoot and midfoot bones were present. In 28.57% of the cases, the proximal phalanges were broken and the medial and distal were missing. The mean height of the adults was 164.07cm (SD ± 5.02) for hypothetical men and 161.37cm (SD ± 5.42) for hypothetical women. The majority of altered angles indicated an elevation of the plantar arch (cavus foot). The most observed pathologies were incipient osteoarthritis (85.75%), Haglund’s deformity (57.14%) and spur (42.86%).

Discussion and Conclusions: Fractures of the phalanges are due to spoliation, while the deformation in cavus of the feet can be due to tissue retraction. The superposition and quality of the radiographs affects their study, creating biases in the measurement. A podiatric protocol can improve the study of mummified LE.

Keywords: Forensic podiatry, anthropology, mummification, angulometry.
A DOCTOR’S HANDWRITING. PRELIMINARY REMARKS ON THE SHORTHAND OF RECIPE-WRITING IN ANCIENT EGYPTIAN MEDICAL TEXTS

C. Di Biase-Dyson¹, M. Glöckner¹

¹ Georg-August-Universität Göttingen, Institute for Egyptology and Coptic Studies, Heinrich-Düker-Weg 14, 37073 Göttingen,

cdibias@uni-goettingen.de

It is well known that the recipes in collections of remedies from Ancient Egypt are written in a particular way [1, 2]. Amongst other things, specific kinds of shorthand are used: grammatical, such as the use of the passive without a marked agent or patient, but also orthographical. Our investigation focuses on the latter, namely, how the scribes of the medical texts shortened Egyptian words so that they were still comprehensible – to themselves, at least. Unfortunately, this insight is sometimes lost on us, so we have to derive much from the context to deduce the meaning behind certain signs. Our case study for this paper will focus on a specific manuscript – Papyrus Hearst – and it will look at one particular case of shorthand, namely, the employment of signs usually used as classifiers (otherwise known as ‘determinatives’) in the manner of logograms (signs standing for whole words), such as the Gardiner Signs Aa2 ♂, A2 ♂, Q7 ♂, D51 ♂ and G39 ♂. These cases are especially problematic, since each sign can stand for several different words: different means of application or ingestion of a remedy (in the case of Aa2 ♂ and A2 ♂), different means of preparation (as with Q7 ♂) or different ingredients (as with G39 ♂). In order to get closer to what word is being used in each context, we consider the function of these signs based on specific criteria, such as the presence or absence of a semogram index (Z1), the use of a classifier or phonetic complementation, and we compare different writings for what may be the same word. Since Hearst is a recipe collection, based on a variety of sources, the varieties of spelling can provide us with a key to unlock the sounds and meanings behind these ambiguous signs.

Keywords: Medical texts, hieroglyphic signs, orthography

References
HEALING WOMEN’S BLEEDINGS IN ANCIENT EGYPT: THE LONDON MEDICAL PAPYRUS

Jessica Alexandra Monteiro Santos
CHAM – Centre for the Humanities
jessica.06@live.com.pt

The health care and medical practices of ancient societies can be usually accessed through the analysis of human remains, which are very informative about, among other aspects, the diet and lifestyle of an individual, as well as traumas and diseases that could have affected them and the healing practices that may have been conducted.

However, other types of sources can also provide us important information concerning these matters. This is the case with medical papyri that survived from ancient Egypt. These written records consist of compilations of medical prescriptions which describe the symptoms caused by a range of diseases and the procedures that should be adopted to cure them, reflecting the Egyptian perceptions on the human body.

In this paper, our goal is to analyze the treatments intended to prevent or to stop women’s bleedings written on the London Medical Papyrus, dated to the New Kingdom. Based on these texts, we aim to investigate the causes that were attributed to such health problems and the methods that were used to heal them.

Keywords: Medicine, London Medical Papyrus, bleedings, women
THE PURE PRIEST OF SEKHMET, BETWEEN HEALTH AND DISEASE

N. Torras Benezet
Universitat Pompeu Fabra, Barcelona
nuria.torras@upf.edu

Beyond his particular ability and knowledge in calming the goddess Sekhmet, the wab-priest had other functions and abilities. We found him to be an expert in medical diagnosis through the observation of blood circulation and as the veterinarian responsible for the bull stables in the temples. He was the only one able to distinguish the living hypostases of the god Apis and was enabled to certify the purity of the animals that would be sacrificed.

However, the wab-priest of Sekhmet presented a double feature in this area: he spread diseases and also cured them. This duality defined him as much as it defined the ambivalent goddess he served. Indeed, holding life and death in his hand, this goddess had the privilege of preserving life but also the power to send calamities. The wab-priest could interact with Sekhmet since his purity immunized him from the dangerous effect of the goddess’s fury. Once pacified and ritually neutralized, a phenomenon of transference and assimilation of Sekhmet’s qualities for his officiant took place. As of the Late Period, the general increase of medical consultations in the temples -as well as animal sacrifices by private individuals- led to an increase in the number of wab-priests whose services as specialists were requested.

**Keywords:** Sekhmet, priests, medical diagnosis, purity, Apis, veterinary.
Pharmacy and Vet in Ancient Egypt
A NEW PROPOSAL FOR THE IDENTIFICATION OF THE ⌞TRЈ-PLANT IN THE BROOKLYN PAPYRUS 47.218.48/85

Maravillas Boccio
Universitat Autònoma de Barcelona. IEPOA

The Brooklyn Papyrus 47.218.48/85 or snakebite papyrus was published by Sauneron in 1989. The manuscript consists of two parts. The first contains descriptions of 38 types of snake; the second part offer remedies to treat poisonous snakebites.

Fragment §90a belongs to the second part of the papyrus. According to its title it is “a remedy to drive out the poison of any snake”. The remedy is obtained by crushing the ⌞TRЈ plant with sweet ale, the result being drunk by the patient.

Most of the text is dedicated to describing the ⌞TRЈ-plant, which is the main active ingredient.

The word ⌞TRЈ is a hapax legomenon and its identification is based on the description in fragment §90a. Sauneron identified ⌞TRЈ as Capparis decidua, but a new reading of the text allows us to think that it could in fact refer to Prosopis farcta.

●trј grows in the Kharga oasis where Prosopis farcta is abundant and Capparis decidua is not. The inflorescence of ⌞TRЈ can be compared with that of ‘ϣϧ (traditionally considered to be Melilotus officinalis, but which we believe to be Melilotus indicus because of the archaeological remains and its area of distribution). As regards the term pds we think it is a reference to the ball-shaped Prosopis farcta. The relation of ⌞TRЈ with sšn (Nymphaea lotus and Nymphaea caerulea) is a result of the rhizome and not the flowers as had been thought. The description of the fruit is more confused as a result of the lack of knowledge of qr and tхw, but both the fruit and the seeds of Prosopis farcta are thick and red.

Current studies suggest that an alcoholic extract from the seeds of Prosopis farcta administered intravenously is efficient against snake bites.

Keywords: phytoegyptology, botanics, Prosopis farcta.
A difficulty we encounter when translating ancient Egyptian medical texts is the identification of drugs. The methods to investigate two of these drugs, shrt and d3rt, have points in common and some differences.

shrt:

My doctoral research on the Sylphium of Cyrene leads me to conclude that this plant is the Ferula assafoetida, white variety. The drug is a fluid that exudes from the plant. Used as a solid powder, when dry, or as a fluid, when fresh. Its Egyptian name is not known.

The next objective is to identify the sylphium-Ferula assafoetida with one of the drugs mentioned in the medical papyri.

The information available is:
- The pharmaceutical properties of sylphium.
- The name of Ferula assafoetida in Eastern Mediterranean languages in antiquity, even in Coptic, gekh.i, a term that can proceed from the Egyptian shrt.
- shrt, not yet translated, is the drug that has the properties of sylphium and the consonants of gekh.i. The study of the determinatives of shrt is significant.
- The non-medical texts mentioning shrt reveal its geographical origin around the area of Cyrene.
- The points mentioned lead to conclude that it could be possible that shrt and sylphium-Ferula assafoetida were the same drug.

d3rt:

The method is almost the opposite, because at the starting point what we know is:
- The Egyptian name of the drug and its determinatives that lead to consider d3rt an exudate.
- The information compiled while investigating shrt.
- d3rt pharmaceutical properties and a mention of its origin from the oasis, lead to identify it with ammoniac gum, Dorema ammoniacum, whose name in Coptic isrk, almost the transliteration of d3rt.

Keywords: sylphium, exudate, pharmaceutical properties, determinatives, coptic
The Coptic physicians realized the value of plants which appeared in their land. Moreover, they distinguished between the different curative effects of the plants. Also, they knew how to extract the drugs from plants, mineral substances such as copper, lead and Hemitite or even from animal resources as horns, blood, and excrement. They also managed to administrate them in the appropriate way by which the physician write the medicine to the patient. There are major categories of remedy administration appearing within the Coptic medical recipes, namely the orally as tablets τροχίσκος, (internal application) rectal means as a pessary kpme, external remedies like powder ξηρόν, collyrium κολλύριον; plaster ἔμπλαστϱον, or the poultice κατάπλασμα, …etc., still, others were taken through inhalation and smoking. The drug preparations usually designated by name in the manuscript. In general, they relate to classical forms and export under their Greek name; only a few have received a Coptic or Arabic denominations such as دوربلا, طوعسلا. Some remedies were applicable during specific seasons, or would be repeated more than one time to be effective.

The purpose of this paper is to explain the administration methods of the remedies, with more evident details recorded in their medical texts. This paper will also discuss the ingredients of each remedy in detail.

**Keywords:** Remedies, Coptic Medicine, Coptic Medical texts, treatments
A CASE FOR DISEASE CONTROL IN CAPTURED BIRDS USING HYENA SALIVA?

Rosalind Park
Independent Scholar
rosalind.park@shaw.ca
Essex, U.K.

Contrary to the scholarly consensus that the ancient Egyptians ate hyena meat,1 the author hypothesises that hyenas were captured in order to harvest their magical saliva, which was then used to treat sickness in birds.

The inference that ancient Egyptians ate hyena, dating from von Bissing’s theory in 19052 derives from the examination of the artwork, in which five images of force-fed hyenas are known. These motifs seem to be restricted to the late 5th/early 6th Dynasties.

Modern research has shown unusually low mortality rates for spotted hyenas from infectious diseases.3,4 Veterinary immunology research on antibody responses related to the extreme disease resistance of the hyena is currently ongoing.

In tomb art of rural daily life, images show the force-feeding of hyenas, typically near a poultry yard where ducks and geese are also being force-fed. It should be noted that human consumption of carnivore meat would be uneconomical if the carnivores were raised in captivity.5 These scenes of force-feeding already fat hyenas suggest to the author procedures in disease prophylaxis. If this is the accepted case, the depictions of oral treatments on captured hyenas with nearby depictions of pellet-feeding of the domestic birds and wildfowl, provide us with the only known portrayal of veterinary medicine in ancient Egypt.

Keywords: hyena; force-feeding; saliva; avian disease control

References
3rd session

Palaeopathological diagnosis and New techniques applied to the study of human remains
PALÉOPATHOLOGIE D’UNE POPULATION ANTIQUE
L’OASIS DE KHARGA AUX ÉPOQUES PTOLÉMAÏQUE ET
ROMAINE

Roger Lichtenberg
Strasbourg University
lichtenberg_roger@yahoo.fr

L’étude porte sur une population de plus de 1000 sujets étudiés entre 1982 et 2014 sur trois sites de l’Oasis, Douch, Aïn el-Labakha et El-Deir. Parmi ceux-ci environ 250 ont été radiographiés sur place. Cette population comporte une majorité d’hommes, un nombre important de femmes et surtout d’enfants. Les âges s’échelonnent des prématurés aux vieillards dépassant 70 ans.

Ce grand nombre de sujets a permis de réaliser, outre l’étude anthropologique, une étude paléopathologique approfondie mettant en lumière leurs conditions de vie, leur régime alimentaire, les maladies dont ils souffraient et, dans une certaine mesure, leur espérance de vie.

Keywords: Population Kharga Oasis Paleopathology  Mortality Diseases
THE INCIDENCE OF PRE-MORTEM TRAUMA IN ANCIENT EGYPTIAN Mummies. CT SCAN EVIDENCE

Robert D. Loynes
KNH Centre for Biomedical Egyptology, University of Manchester.
robert.loynes@manchester.ac.uk

Using the medium of CT scans a series of 96 mummies from ancient Egypt was examined to determine the incidence of trauma. The cohort originated in an extensive range of locations and comes from a wide variety of eras. Of the 56 individuals with evidence of trauma of any description, there were 18 with possible evidence of pre-mortem trauma. Of these the diagnosis was almost certain in 13.

The diagnosis of pre-mortem trauma and how it may be distinguished from post mortem damage is discussed with illustrated examples of each.

Comparing the findings in these mummies with patterns of bony trauma in current real life clinical practice can help to increase the probability of a correct diagnosis and examples are presented.

Other specimens illustrate the more obvious cases of post-mortem trauma due to handling mistakes – regardless of whether these were inflicted by the embalmers or occurred later when the artefacts were on their journey from tomb to museum and subsequently to the CT table.

From this study it is clear that caution has to be exercised when making the diagnosis of pre-mortem trauma in these artefacts.

Keywords: Egypt; mummy; trauma; premortem; CT scan
AN ORTHOPAEDIC ENIGMA
WHAT CAN DISMUTENIBTES TELL US ABOUT ORTHOPAEDIC PATHOLOGY?

Robert D. Loynes\textsuperscript{1} and Anne Karin Håbu\textsuperscript{2}

\textsuperscript{1} KNH Centre for Biomedical Egyptology, University of Manchester.
robert.loynes@manchester.ac.uk

\textsuperscript{2} Kulturhistorisk museum, Universitetet i Oslo. 0130 OSL.
a.k.habu@khm.uio.no

As the search for morphological changes in a mummy is most likely to be rewarded by studying the bony skeleton, it is particularly fitting that an unusual combination of bony orthopaedic changes should be demonstrated in an ancient Egyptian mummy.

Dismutenibtes is from D25 Thebes and remains on display in Oslo museum. Although examined by Daa and Vos in 1875 the pathological features of the skeleton remain clear. The mummy was CT scanned in 2016 on a Toshiba (now Canon) machine with a slice thickness of 0.5 mm.

The bony pathology is of three distinct types: - multiple intra-osseous haemangiomata in both the skull and several vertebral bodies; an osteoma of the frontal sinus and an adolescent scoliosis.

Whilst all of these pathologies are of relatively low incidence individually, the combination of them in one individual is (as far as the author can find) as yet, unreported and almost certainly exceedingly rare.

The pathology of the lesions, their possible consequences upon the individual’s life and their incidence are discussed.

\textbf{Keywords:} Egypt; mummy; bony pathology; haemangioma; osteoma; scoliosis
THE CANOPIC JAR PROJECT: INTERDISCIPLINARY ANALYSES OF ANCIENT HUMAN SOFT TISSUES

Enrique Rayo\textsuperscript{1} (enrique.rayo@iem.uzh.ch),
Lana Brockbals\textsuperscript{2} (lana.brockbals@irm.uzh.ch),
Thomas Krämer\textsuperscript{2} (Thomas.Kraemer@irm.uzh.ch),
Francesco Galassi\textsuperscript{1} (francesco.galassi@iem.uzh.ch),
Michael Habicht\textsuperscript{1} (michael.habicht@iem.uzh.ch),
Patrick Eppenberg\textsuperscript{1} (patrick.eppenberger@iem.uzh.ch),
Frank Ruhli\textsuperscript{1} (frank.ruehli@iem.uzh.ch).

\textsuperscript{1} Institute of Evolutionary Medicine, University of Zurich
\textsuperscript{2} Institute of Forensic Medicine, University of Zurich

Ancient Egyptian remains have been of interest for medical and egyptological researchers for decades. However, the canopic jars, holders for internal organs (liver, lungs, stomach, intestines), of Egyptian mummies are barely used for palaeopathological investigation. The Canopic Jar Project is laying a foundation for research procedures by examining a large series of samples from Egyptian organ holders in European and American museum collections. Our goal is to establish standard procedures to identify the organ interred and any pathologies. We use paleogenetic next-generation sequencing to assess DNA preservation, chemical analysis to identify the components used during embalming approaches, as well as histology and radiology techniques. The data from this project will be combined with those already accumulated during the Swiss Mummy Project, to give a holistic view of the history of a disease and will be accessible to researchers from multiple disciplines and other stakeholders. By ensuring that we have a multi-disciplinary approach, we aim to provide a clearer picture of, among other things, the evolution of human health, but also to elucidate proceedings and funerary practices in Ancient Egypt.

Keywords: Mummy studies, canopic jars, histology, radiology, ancient DNA, palaeopathology.
Radiographic imaging of mummified ancient human remains on site, during archaeological excavations or in museums, is an essential instrument for paleopathological and anthropological research. The examination of complex three-dimensional structures using planar x-rays, e.g. in mummy heads, is, however, particularly challenging. Although various techniques and projections can be applied to minimize disturbing superposition artefacts, diagnostic output for structures such as the dentition, the skull base or the temporo-mandibular joint remains limited. Yet, portable planar x-ray imaging is often the only imaging method available under field conditions. Examination by computed tomography (CT) would solve such issues, but would also require transportation of the specimen to a facility where a CT scanner is located, which is often not feasible. We therefore developed a sparse view tomographic technique, using portable digital planar x-ray equipment, to achieve CT-like cross-sectional images on site and under field conditions. In this study, several ancient Egyptian specimens were imaged and diagnostic quality of the resulting images was compared to conventional planar x-rays and traditional CT scans of the same specimens. Our results show that with the proposed method details of complex anatomical structures, which are otherwise difficult to represent, can be precisely imaged and that substantial added diagnostic value can be achieved with minimal additional instrumental involvement.

**Keywords**: mummy head, portable digital planar x-ray equipment, sparse view computed tomography, cross-sectional images, during archaeological excavations
Poster session
ANALYSIS OF THE MINERALS USED IN THE OCULAR REMEDIES IN ANCIENT EGYPT

Argiles Sans Marc; Sabi Dolz Roger; Marques Calvo Marisol
Polytechnic University Of Catalonia;
University Of Barcelona;
marcargiles@gmail.com

Nowadays we found ocular pathologies with well-based treatments in the clinical practice, but it is interesting to know that in Ancient Egypt the physician knew and treat a range of ocular pathologies found at these days. The information for this work was extracted by a revision of the literature of the ancient papyrus that shows specifically the treatment of the ocular pathologies, specially Ebers and Edwin Smith papyrus. These papyruses describe ocular inflammations, cataracts (described by opacities), hemorrhages, leucomas and epiphora. The treatments were based on three different origins, such animal, vegetal and mineral. The aim of this study was to describe the origin and properties of the minerals used in remedies to treat ocular pathologies; which some of the most used were Galena, Malachite, Laurent and Chrysocolla. First, we found that most of them were probably obtained from mines in Egypt. However, for instance, Lapislatzuli was found at Afghanistan. We can say that the ancient physician has to work closely with traders and be aware of these localities to found the raw material in case of minerals for their remedies. In a second part, we analyzed all the mechanical, chemical and optical properties of these minerals. Most of these minerals are lead-based compounds with recognized antibacterial properties. Lead is a toxic element at high levels, but at low levels can induce a change in a pH environment and inhibits the bacterial grown. The color of the minerals is also important; black remedies are made from Galena and green from Malachite. Most of these minerals were widely used for remedies but also for makeup, to prevent either eye disease or “evil eye”. To our knowledge, this is the first study to link and analyze either origins or properties of minerals used in remedies in Ancient Egypt.

Keywords: Ocular
The Ancient Egyptian culture was always a mystic, magic and amazing subject for Europeans. Egypt impressed people of great eminence during history as well, among others Napoleon Bonaparte. During his Campaign in Egypt (1798-1801) many scientists and scholars were assigned to the invading French force.

Fülöp Back, a Hungarian merchant aimed to show the miracle of Ancient Egypt to the Hungarian people. Therefore, he financed a mission in Sharuna and the cemetery of Gamhud in 1907. The scientific leader of the excavations was T. Smolensky, a Polish Egyptologist, but since he has been ill with tuberculosis, the work was finished by A. Kamal. One part of the explored artefacts arrived in Budapest, to the Museum of Ethnography in the autumn of 1909. Later the mummies, coffins, and all objects of arts of its Egyptian collection were moved to the Museum of Fine Arts. A. Dobrovits Egyptologist and L. Bartucz anthropologist investigated the mummies incorporated into this Museum’s collection according to the custom of the age by unwrapping. Most of the anthropological material was given to the Natural History Museum, while all other material stayed in the MFA.

The aim of the recent study is the multidisciplinary examination using physical, chemical and radiological diagnostic (ICP, FTIR, FAAS, RTG, CT, SEM) methods, with the application of non-destructive techniques mostly. The purpose is to learn more about the mummification process and to resent data on the health condition of the people mostly lived in Gamhud but also in other parts of Egypt.

Keywords: mummy, multidisciplinary methods, Egyptian, Gamhud, mummification, ICP, FTIR, FAAS, RTG, CT, SEM
A MUMMIFIED HEART FROM A MUMMIFICATION DEPOSIT OF THE MIDDLE KINGDOM

M.F. Carrillo-Rodríguez¹, E. Dorado-Fernández², A.J. Morales³

¹Dept. of Surgery, Health and Medical Sciences, University of Alcalá, Alcalá de Henares, Spain, manuel.carrillo@uah.es
²Service of Forensic Anthropology, Institute of Legal Medicine, Madrid, Spain
³Dept. of Philosophy and Ancient History, University of Alcalá, Alcalá de Henares, Spain

In general terms, the heart of a mummified individual in ancient Egypt was left in situ or otherwise it was extracted, independently embalmed and afterwards put into the thoracic or abdominal cavities [1,2,3,4]. In this work, we present for the first time a pack containing a mummified heart found in the mummification cachette of the Middle Kingdom official Ipi - item nr. MKTP 2480 of the Middle Kingdom Theban Project findings at Deir el-Bahari. After the inspection, it corresponds without any doubt to a desicated and exceptionally well-preserved human heart possibly covered by a resin layer. It presents a laceration in the right auricula with uprooting of both cavae veins. The whole piece, including ventricles, auricles and pulmonary trunk is indistinctly and tightly wrapped in a very good quality cloth linen. The aortic root received a special treatment, being carefully and independently wrapped in a linen bandage as well as plugged with a bandage roll, giving to the piece a shape which resembles precisely that of the hieroglyphic representation of a heart. The exceptional preservation of both the piece and its wrappings is possible due to having been kept in a jar containing numerous natron packs [5].

We will provide a description of the organ, accompanied with high quality images, and will discuss the mummification practices involved as well as the Egyptological interpretation of the context in which the heart was found, suggesting some hypothesis for its location therein.

Keywords: Heart, Mummification, Middle Kingdom

References

Mummification and Variations
APPLICATION OF OILS AND RESINS DURING THE PROCESS OF MUMMIFICATION: EXPERIMENTAL ANALYSIS AND STUDY PROBLEMS.

García-Jiménez, Laura

Egiptología Complutense, Universidad Complutense de Madrid, España

laugarciajimenez@gmail.com

The embalmers that carried out the mummification, they applied several substances during the different steps for the objective of preservations of the body and to secure the eternity in the afterlife.

These materials applied during the process of mummification have been a problem when identifying the typology and how they were employed. The cedar oil or the resin are some examples. Since 19th century the researchers obtained the sources of the Egyptians papyrus and of the classic authors, but there are unknown words or misinterpreted. The science advances and in the middle of the 20th century forwards, they can be observe how the studies about the possible materials were more exhaustive, analyzing the mummies themselves as source of knowledge. Experiments have always been a good way to see the reality of theories with our own eyes.

Thus, with the experiment that I realized in 2014, applied the three methods describe by Herodotus in three rabbits, I saw the reality of the problem regarding substance to apply. For which I contrasted with the classical authors as Herodotus, Diodorus and Plinius among others, and I gathered information of researches of the two last centuries, highlighting to Lucas, Garner, Ikram and Brier as empirical investigation; and Abdel-Maksoud, Buckley, Nerlich, Zink and others as laboratory research.

The fact that some substances are volatile or of unknown origin are one of the many limitations for their study, but thanks to new technologies, we can begin to clarify some of the doubts that had arisen.

The objective is to expose all these doubts and hypotheses, compare them with the results and conclusions of my experiment, and finally to present a current image of the possible embalming products.

Keywords: mummification, materials, oil, resin, experiment
EXPERIMENTAL MUMMIFICATION USING HERODOTUS DESCRIPTION - A 7-YEAR LONGTERM EXPERIENCE OF A HUMAN-SIZED ANIMAL MODEL

Andreas Nerlich; Röcker Pascale
Institute of Pathology, Academic Clinic Munich-Bogenhausen;
Andreas.Nerlich@extern.lrz-muenchen.de

In ancient Egypt the preparation of human bodies to mummies has reached a considerably high level. The most important description comes from Herodotus who described exenteration, cleaning, dehydration, surface-treatment and bandaging of the dead body.

Previous experimental studies on this subject have very rarely used human bodies and unfortunately only little data have been published about these experiments. More information is available about other experiments on small animals which considerably different size to humans or animals with a significantly differing body surface (fur or plumage!).

We therefore used a 88 kg piglet (1,30 m body length) that has a skin surface similar to humans. Despite some difference in the body composition (especially a slightly higher fat content) this model comes close to humans. The body was obtained one day after death, cleaned, eviscerated according to Herodotus description, then filled with natron packages and covered with a total of 240 kg natron for 40 days. After that period the body was reopened, most packages were removed and the external and internal surfaces were cleaned with wine, the body cavity partly filled with aromatic spices and the body surface treated with a mixture of oils, waxe and bitumen and sealed with linen bandages. The body weight was regularly monitored over a period of now 7 years.

After 6 years an extensive reexamination (CT, MRI, histology and microbiology) revealed an excellently preserved body that had lost approx. 65% of its weight. The structures of the heart, muscle, skin and soft tissue were well preserved, the body significantly shrunk, but completely intact. Histology and microbiology revealed excellently conserved tissue with anaerobic microbe spores, but only very limited tissue destruction and no significant fungal or parasitic invasion.

Our long-term experiment shows an excellent outcome with perfect body conservation so that we can confirm Herodotus description providing a successful result.

Keywords: experimental mummification, longterm outcome, CT, MRI, histology, microbiology
EXCAVATIONS AT THE SOUTH TOMBS CEMETERY OF AMARNA

Summary campaign 2012

Emma González
Centre d’Estudis de l’antic Egipte Upuaut.
Member of the Amarna Project team.

In one of the eastern wadis near the rocky cliff that delimits the territory of the ancient Akhetaten, is located a set of cemeteries corresponding to the less privileged classes of Egyptian society that inhabited this city during the Amarna Period.

Known as South Cemetery, the necropolis encompasses different areas of burial scattered throughout the desert. All of them constitute one of the largest funerary extensions corresponding to the underprivileged social classes at the time discovered in Egypt.

The works in this area began during the 2005 with an exhaustive prospection which made it possible to obtain bones and ceramic remains scattered in the entire surface. A year later, the first archaeological works would take place. From this moment until 2013, eight campaigns have been carried out with the purpose of exposing a significant percentage of the vast necropolis and achieve, in this way, the greatest possible number of samples that allow us to carry out a comprehensive representative study of its entirety. The results obtained throughout the excavations provide valuable information about aspects related to the living conditions and diseases of the population as well as on their religious beliefs and their funeral practices.

The season carried out during 2012 was focused upon the Lower and Wadi Mouth Sites, as well as in the Upper Site excavating graves identified but left unexcavated in 2010. The bones remains and objects discovered have been decisive to corroborate, complement and extend the results obtained in the previous campaigns linked, specially, with the funeral rites practiced and the pathologies of the inhumed individuals.
SPONSORS: