

CANCER IN EGYPT :

A STUDY OF LITERARY & BIOARCHAEOLOGICAL EVIDENCE

Kathryn J. Hunt^{1,3} & Roselyn A. Campbell^{2,3}

¹Durham University ²Cotsen Institute of Archaeology, UCLA ³Paleo-oncology Research Organization (PRO)

Introduction:

Studies concerning the occurrence of cancer in ancient Egypt tend to focus on purely literary or osteological evidence. Literary evidence can provide insight into social and medical perceptions of cancer and can also reference malignant growths of soft tissues and organs that might otherwise be missed by skeletal evidence. However, bioarchaeological data can indicate different types of cancer or growths that have metastasized to the skeleton as well as incidence rates, biomolecular data, and empirical perspectives of analysis. Both of these approaches have inherent limitations, and it is only by integrating literary and bioarchaeological evidence for this disease that we can begin to understand the effects of cancer in ancient Egypt.

Bioarchaeological evidence:

46 individuals from 16 sites showing bioarchaeological evidence of cancer have been recorded in 27 published case studies (Figure A). The geographic distribution of malignancies in Egypt and Sudan follows the Nile River with the majority of cases located in Upper Egypt, and Northern Nubia (Figure B). One case, from Kellis 2 in the Dakhleh Oasis (Dupras 2013b), falls outside of the Nile Valley. No other skeletal evidence of cancer has been found in the other oases or in the coastal areas bordering the Red Sea and the Mediterranean Sea.

The temporal distribution of cancer in ancient Egypt and Nubia follows a fairly linear increase from the Prehistoric Period (3500 BC) to the Middle Ages (1500 AD) (Figure C).

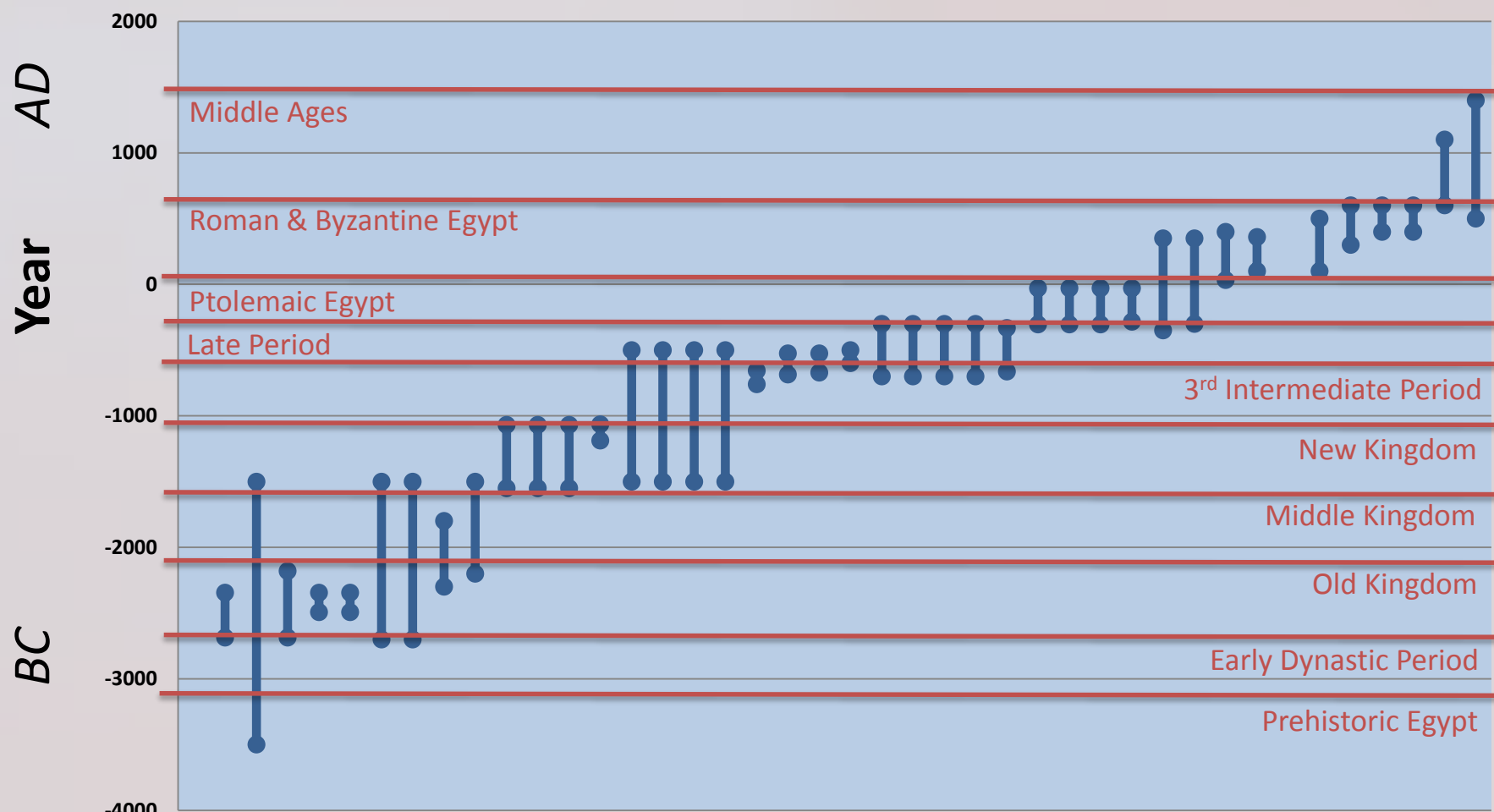
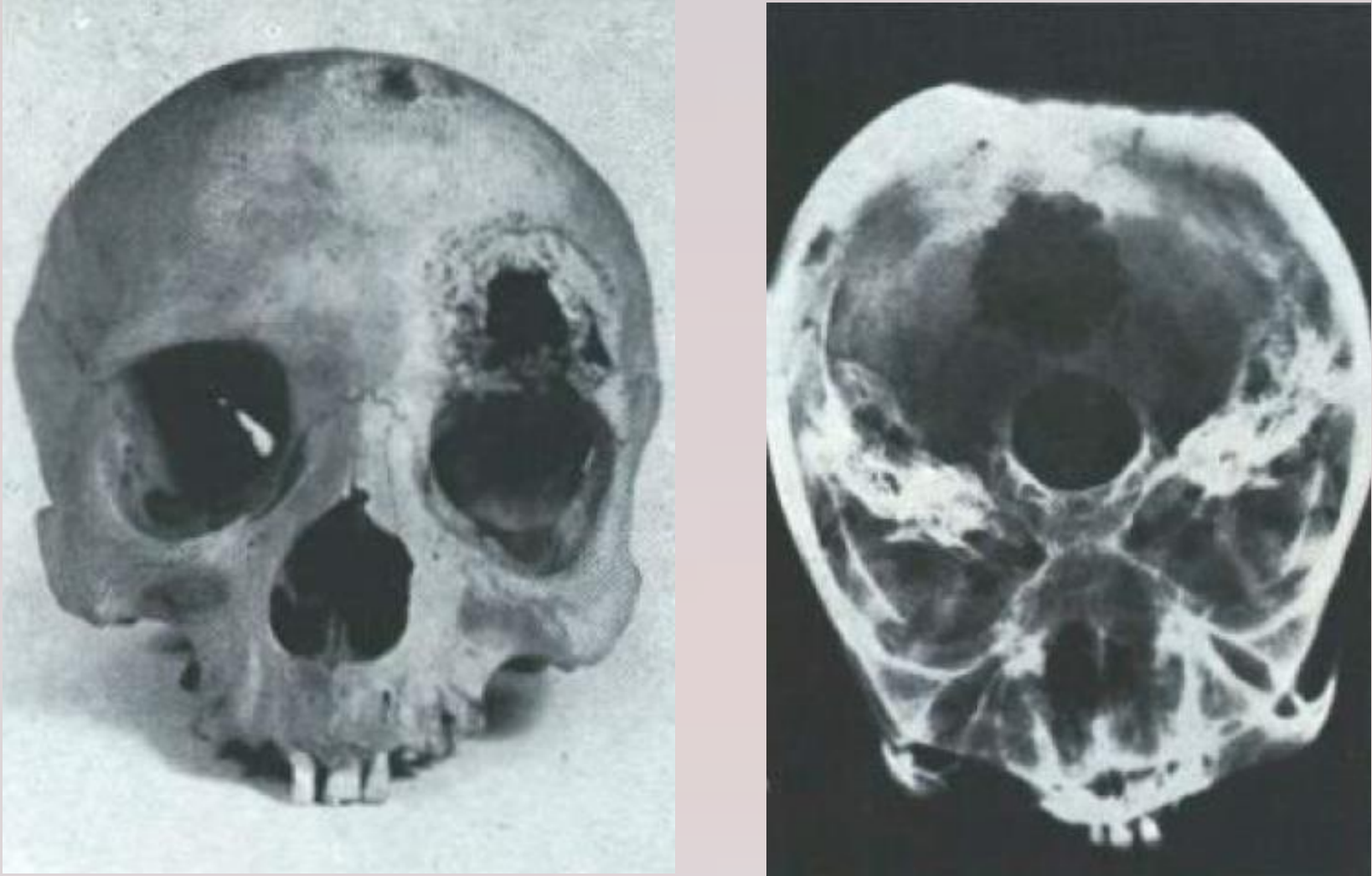


Figure C: Estimated date ranges of individual burials with skeletal evidence of cancer in Egypt. (Hunt 2013)



A skull recovered from a Ptolemaic Assiut burial showing destructive lesions indicative of metastatic carcinoma (Satinoff 1972).

Demography: Most of the aged individuals with evidence of cancer fall within the cohort of young to middle-adult (20-39 years). Females and males represent a 1:1 distribution of sex in the regional total of cancer. However, older-adult males outnumber older-adult females with malignancies 5:2 (Figure D)

N	Age				sex			CPR
	Non-adult	YA-MA	OA	Unk.	M	F	Unk.	
46	--	15	7	24	19	19	8	0.71% (19/2685)

Figure D: Demographic data of case studies from Egypt and Nubia (Hunt 2013).

Distribution of diagnostic evidence (Hunt 2013)	
Metastatic carcinoma.....	24/46 (52%)
Multiple myeloma.....	9/46 (19.5%)
Osteosarcoma.....	5/46 (11%)
Nasopharyngeal carcinoma.....	4/46 (8.7%)
Malignant meningioma	1/46 (2.2%)
Uncertain malignancies.....	3/46 (6.5%)

Methodology: Visual analysis was used in every case study. Radiography, including computed tomography (CT), was employed in the analysis of 15 individuals, and 2 were diagnosed with the aid of microscopic methods. Biomolecular methods of analysis were not used in any of the case studies.

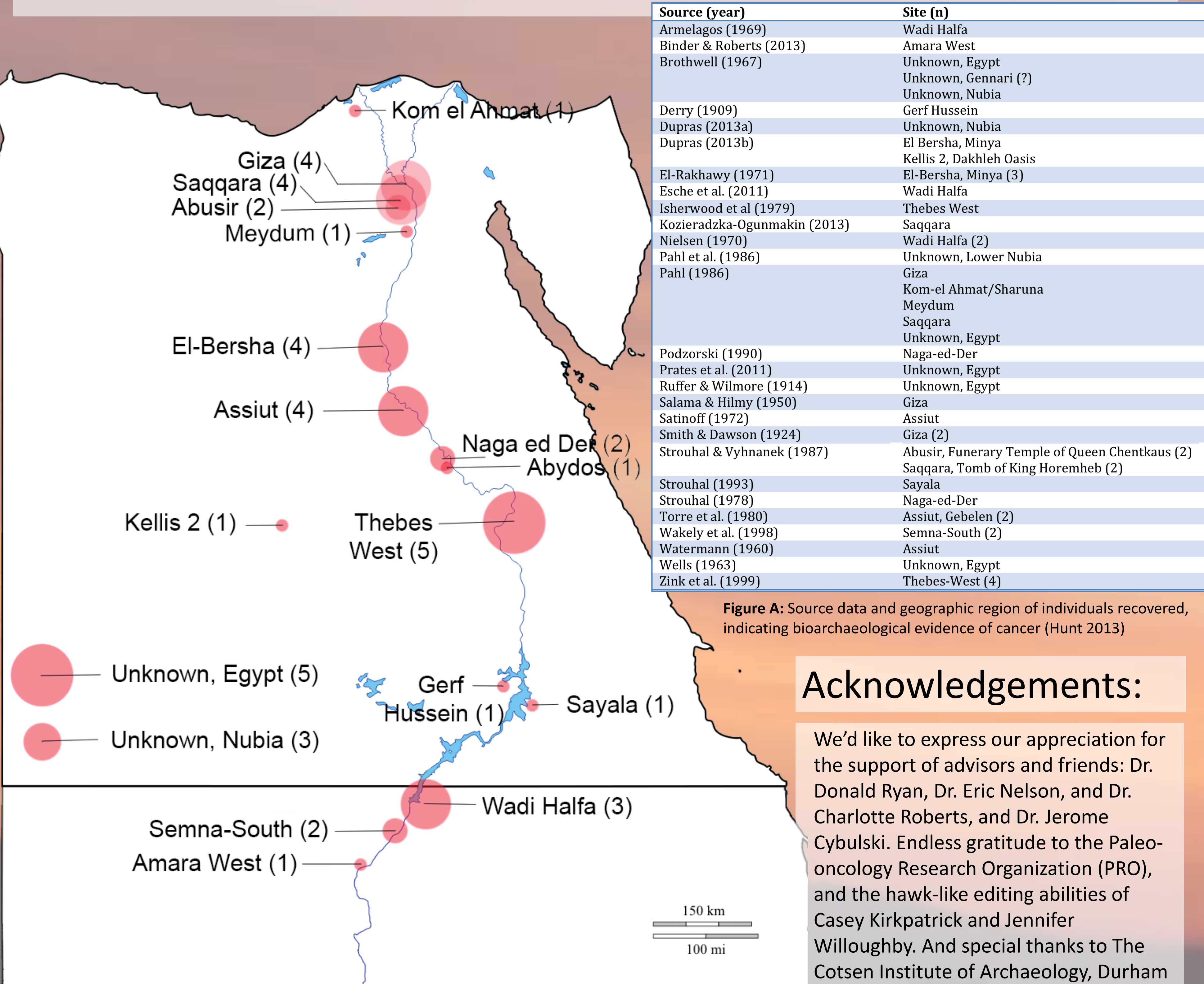


Figure A: Source data and geographic region of individuals recovered, indicating bioarchaeological evidence of cancer (Hunt 2013)

Acknowledgements:

We'd like to express our appreciation for the support of advisors and friends: Dr. Donald Ryan, Dr. Eric Nelson, and Dr. Charlotte Roberts, and Dr. Jerome Cybulski. Endless gratitude to the Paleo-oncology Research Organization (PRO), and the hawk-like editing abilities of Casey Kirkpatrick and Jennifer Willoughby. And special thanks to The Cotsen Institute of Archaeology, Durham University, Pacific Lutheran University, and the TED Organization.

Literary Evidence:

The literary evidence for cancer in ancient Egypt is often elusive for several reasons. The idea of cancer as a disease, and the very name “cancer,” were not in use until the fourth century AD, and thus the Egyptians could have identified different types of cancer as different ailments. In addition, ancient Egyptian physicians had little knowledge of the internal workings of the human body, and thus their diagnoses and prescriptions would have relied entirely on tangible symptoms, such as visible swellings or palpable tumors. Because of these limitations, a secure identification of cancer in Egyptian medical texts may be extremely difficult. Nevertheless, literary sources may reveal evidence for soft tissue tumors (such as breast cancer tumors) that would be invisible in the osteological analyses, particularly if the tumor did not metastasize to the skeleton.

Several medical papyri mention possible tumors, or conditions related to tumors, particularly the Ebers Papyrus. The compilation of diagnoses, treatments, and magical spells for healing contains several references to growths that resemble tumors (see Figure E). The translation of many of these words is uncertain, partly because they often occur only once or twice and then only in medical texts, and various authors have translated them in different ways. According to Veiga (2008), *ʿ3.t* may refer to a type of tumor that primarily afflicted young people, such as neuroblastomas or Ewing’s sarcoma. Other words are even more vague, such as *bn.wt* and *ʿ3*, which seem to refer to some sort of malevolent influence that caused disease and infection.

Hieroglyph form	Transliteration	Direct Translation (Faulkner)
	ʿ3	“evil influence” causing disease
	<i>bn.wt</i>	"inflammation, swelling"
	<i>whdw</i>	"something that is painful"
	<i>ʿ3.t</i>	disease, tumor (Veiga 2008) [potentially formed from ʿ3]
	<i>šf.wt</i>	swelling, tumor (Veiga 2008) [this seems to be the substantivized noun of šf, “to swell”]

Figure E: Middle Egyptian words potentially referencing cancer and symptomatically similar diseases in the Ebers and Edwin Smith papyri.

Words describing specific types of cancer might have made an appearance in ancient Egyptian medical literature. Breast cancer may be the malady described in the Ebers Papyrus as “ill breast,” and the Edwin Smith Papyrus contains eight references to a malignant breast disorder, which could refer to breast cancer or to some other type of inflammation of the breast (Breasted 1930, Sandison 1962, Brothwell and Sandison 1967, Sigerist 1951). As these soft tissue tumors would likely not survive the in archaeological record, even in the case of mummification, a specific differential diagnosis may not be possible without multidisciplinary methods including historical and biomolecular analyses.

Discussion:

Despite a common misconception that cancer is primarily a disease of modern populations, increasing evidence has suggested that cancer did, in fact, afflict ancient populations. The emerging field of paleo-oncology, which approaches the study of cancer in antiquity from multiple disciplines including classics, linguistics, history, clinical medicine, medical anthropology and bioarchaeology, promises to shed new light on this disease.

Although bio-archaeological data can contribute to biological records of cancer, it cannot determine the social perceptions and reactions towards diseases, such as cancer, in the ancient world. Literary evidence from Egypt and other ancient regions rich in literary culture could shed light on mysterious aspects of health, well-being, and disease history, and could provide scholars insights into medical remedies, practices, and perspectives of cancer in the past.

Ancient Egyptian medical literature remains among the oldest literary evidence of cancer in the ancient world. Extensive research has addressed the recognition of potential herbal medicine, medicinal practices and pharmacopoeia described in ancient Egyptian papyri. A study of ancient Egyptian literary and bioarchaeological evidence may offer significant insights into cancer in antiquity and contribute to the growing body of scholarly literature in the field of paleo-oncology – a field that has the potential to contribute significant information about the global history of cancer to future cancer research.

Bibliography:

Armellagos G.J. (1969). Disease in Ancient Nubia. Science, 163:255-259
Binder, M. and Roberts, C.A. (2014). Cancer in Ancient Egypt: A Skeleton with Metastatic Carcinoma from Amara West, Upper Nubia (3200BC). In preparation
Breasted, J.H. (1930). The Edwin smith surgical papyrus (University of Chicago press, Chicago)
Brothwell, D. (1967). The evidence for neoplasms. In D. Brothwell and A. Sandison (eds), Diseases in Antiquity. Springfield, Ill., C.C. Thomas, pp. 320-345
Brothwell, D. and Sandison, A.T. (1967). Disease in Antiquity. (Thomas, Springfield) p 512-513
Derry D. E. (1909). Anatomical Report: The Archaeological Survey of Nubia, Bulletin, 3:29-52
Dupras, T., Lana Williams, Peter Sheldrick, Britanny Walter , Bart VanThuyne & Sandra Wheeler (2013a). Cancer, a Disease of Modern Industrial Society? Not Likely! A Review of Old and New Evidence from Ancient Egypt. Proceedings of The Bioarchaeology of Ancient Egypt Jan31-Feb2, 2013 in Cairo, Egypt
Dupras, T., Alex de Voegt, Vincent Francigny, Lana Williams, and Jacklyn Lacey. (2013b). Advanced Metastatic Carcinoma in the Paleopathological Record: A Case Study from the Sudan - In preparation
El-Rakhawy, M. T., El-Eishi, H. I., El-Nofely, A., & Gaballah, M. F. (1971). A contribution to the pathology of ancient Egyptian skulls. Anthropologie, 9, 71-78.
Esche E., Mummert A., Robinson J., Armellagos G.J., (2011). Cancer in Egypt and Nubia. Anthropologie (Brno) 48, 2: 133-139.
Hunt, Kathryn (2013). Cancer in Bioarchaeology: A comprehensive survey of malignant neoplastic disease in published case studies. MSc Paleopathology dissertation, Durham University, Durham, UK.
Isherwood I., Jarvis H. and Fawcett R.A. (1979). Radiology of the Manchester Mummies, In: David, A.R. (ed.) The Manchester Museum Mummy Project, Manchester Museum Publications. pp 25-64
Kozieradzka-Ogunmakin, Iwona (2013). A Case of a Metastatic Carcinoma in an Old Kingdom Skeleton from Saqqara. Proceedings of The Bioarchaeology of Ancient Egypt, Jan31-Feb2, 2013 in Cairo, Egypt
Nielson O.V. (1970) Human Remains. Metrical and non-metrical anatomical variations. The Scandinavian Joint Expedition to Sudanese Nubia, Vol 9. Scand. University Books, Copenhagen.
Pahl, W. M. (1986). Tumors of bone and soft tissue in ancient Egypt and Nubia: a synopsis of the detected cases. International Journal of Anthropology, 1(3), 267-275.
Pahl, W. M., Assad, E., Khattar, N. Y., & El-Melley, M. (1987). Macroscopic and radiological aspects of tumors of the skull in ancient Egyptians—(Part I). Journal of human evolution, 2(4), 329-363.
Podzorski, F.V. (1990) There Bones Shall Not Perish: An examination of Predynastic human skeletal remains from Naga-ed-Der in Egypt. SIA Publishing. pp 63-65
Prates, C., Sousa, S., Oliveira, C., & Ikram, S. (2011). Prostate metastatic bone cancer in an Egyptian Ptolemaic mummy, a proposed radiological diagnosis. International Journal of Paleopathology, 1(2), 98-103.
Ruffer M. and Willmore J. (1914). Note on a tumor of the pelvis dating from Roman times (250 AD) and found in Egypt. Journal of Pathology and Bacteriology 18:480-484.
Salama N. and Hilmy A. (1950). A Case of Osteogenic Sarcoma of the Maxilla in Ancient Egypt. British Dental Journal 88: 101-102
Sandison, A.T. (1962). An autopsy study of adult human breast. Bethesda NCI Monograph
Satinoff, M.I. (1972). The medical biology of the early Egyptian populations from Asswan, Assut and Gebelen. Journal of Human Evolution, 1(3), 247-257.
Smith G.E. and Dawson W.R. (1924). Egyptian Mummies. Allen & Unwin, London.
Strouhal, E. & Vyhnanek, L. (1987). Nouveaux exemples de tumeurs osseuses malignes provenant de cimetières égyptiens de la Basse Époque. Bulletins et Mémoires de la Société d'anthropologie de Paris, XIV Serie, 4(3):159-169
Strouhal, Eugen. (1993). A Case of Carcinoma from Christian Sayala (Egyptian Nubia). Anthropologischer Anzeiger 51(2):97-115 PDF in "MSc" folder
Strouhal, Eugen. (1978). Ancient Egyptian Case of Carcinoma. Bulletin of the New York Academy of Medicine 54(3): 290-302
Torre, C., Giacobini, G., & Sicuro, A. (1980) The skull and vertebral column pathology of Ancient Egyptians. A study of the Marro Collection. Journal of Human Evolution, 9(1), 41-44.
Veiga, Paula Alexandra de Silva. (2009). Health and Medicine in Ancient Egypt: Magic and Science. (Archaeopress, Oxford) pp. 54-55
Veiga, Paula Alexandra de Silva. (2008). Oncology and Infectious Diseases in Ancient Egypt: The Ebers Papyrus' Treatise on Tumours 857-877 and the Cases Found in Ancient Egyptian Human Material. (VDM Verlag Dr. Muller Aktiengesellschaft & Co. KG/ Deutschland)
Wakely, J., Strouhal, E., Vyhnanek, L. & Nemecková, A. (1998). Case of a malignant tumour from Abingdon, Oxfordshire, England. Journal of archaeological science, 25(10), 949-955.
Watermann R. (1960). Paleopathologische Beobachtungen an altägyptischen Skeletten und Mumien. Homo, 11: 167-179
Wells, C. (1963). Ancient Egyptian pathology. J Laryngol Otol, 77, 261-265.
Zink AR, Nerlich AG, Panzer S, Molnar E, Pajz L, Marscik A. (2004). A case of a metastatic cancer form the 10th-11th century in Hungary (Abstract) – 15th European Meeting of the Paleopathology Association, Durham, UK, p.106