

American Drugs in Egyptian Mummies

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Abstract:

The recent findings of cocaine, nicotine, and hashish in Egyptian mummies by Balabanova et. al. have been criticized on grounds that: contamination of the mummies may have occurred, improper techniques may have been used, chemical decomposition may have produced the compounds in question, recent mummies of drug users were mistakenly evaluated, that no similar cases are known of such compounds in long-dead bodies, and especially that pre-Columbian transoceanic voyages are highly speculative. These criticisms are each discussed in turn. Balabanova et. al. are shown to have used and confirmed their findings with accepted methods. The possibility of the compounds being byproducts of decomposition is shown to be without precedent and highly unlikely. The possibility that the researchers made evaluations from faked mummies of recent drug users is shown to be highly unlikely in almost all cases. Several additional cases of identified American drugs in mummies are discussed. Additionally, it is shown that significant evidence exists for contact with the Americas in pre-Columbian times. It is determined that the original findings are supported by substantial evidence despite the initial criticisms. [Please refer also to [Edlin](#)]

In a one-page article appearing in *Naturwissenschaften*, German scientist Svetla Balabanova (1992) and two of her colleagues reported findings of cocaine, hashish and nicotine in Egyptian mummies. The findings were immediately identified as improbable on the grounds that two of the substances were known to be derived only from American plants - cocaine from *Erythroxylon coca*, and nicotine from *Nicotiana tabacum*. The suggestion that such compounds could have found their way to Egypt before Columbus' discovery of America seemed patently impossible.

The study was done as part of an ongoing program of investigating the use of hallucinogenic substances in ancient societies. The authors themselves were quite surprised by the findings (*Discovery*, 1997) but stood by their results despite being the major focus of criticism in the following volume of *aturwissenschaften*. Of the nine mummies evaluated, all showed signs of cocaine and hashish (Tetrahydrocannabinol), whereas all but one sampled positive for nicotine. It is interesting too that the concentrations of the compounds suggest uses other than that of abuse. (For example, modern drug addicts often have concentrations of cocaine and nicotine in their hair 75 and 20 times higher respectively than that found in the mummy hair samples.) It is even possible that the quantities found may be high due to concentration in body tissues through time.

Without question, the study has sparked an interest in various disciplines. As Balabanova et. al. predicted, "...the results open up an entirely new field of research which unravels aspects of past human life-style far beyond [sic] basic biological reconstruction."

The Criticisms

The biggest criticism of the findings of Balabanova et. al. was not necessarily directed at the extraction process per se, although this was discussed. The biggest criticism was that cocaine and nicotine could not possibly have been used in Egypt before the discovery of the New World, and that transatlantic journeys were not known - or at least they are highly speculative. It is safe to say that the criticisms of the study would have been minimal or nonexistent if the findings had been made of Old World drugs. Such findings, in fact, would not have been at all unusual as the use of stimulants were known in Egypt. Poppy seeds and lotus plants have been identified for just this use in manuscripts (the Papyrus Ebers) and in hieroglyphs (as Balabanova et. al. show).

Schafer (1993) argues that, "the detection of pharmacologically active substances in mummified material never proves their use prior to death." He argues that such compounds could have been introduced as part of the mummification process. The suggestion is that (especially) nicotine could have been introduced around the mummy (and subsequently absorbed into its tissue) as an insecticide (being used as a preservative) within relatively modern times. A similar criticism was raised by Bjorn (1993) who wondered if nicotine might have been absorbed by the mummies from cigarette smoke in the museums where the mummies have been preserved. According to Schafer, the only way to show that the compounds were taken into the bodies while they were alive

would be to find different concentrations at different distances from the scalp - a procedure not undertaken by the authors.

Another interesting criticism of Schafer (1993) is that Balabanova et. al. might have been the victims of faked mummies. Apparently people (living in the not too far distant past) believed that mummies contained black tar called bitumen and that it could be ground up and used to cure various illnesses. In fact the very word 'mummy' comes from the Persian 'mumma' meaning bitumen (Discovery, 1997). A business seems to have developed wherein recently dead bodies were deliberately aged to appear as mummies and that some of the perpetrators of such deeds were drug abusers.

The criticism that seems most popular is that the identified drugs might have been products of "necrochemical and necrochemical processes" (Schafer, 1993; Bjorn, 1993). One explanation is that Egyptian priests used atropine-alkaloid-containing plants during the mummification process that subsequently underwent changes in the mummy to resemble the identified compounds.

Yet another argument is that there is nothing in the literature showing that any of the three compounds have been identified in bodies that have been dead for some time.

Reply to the Critics

Analytical Techniques and Contamination

"In the study, samples were taken from nine mummies that were dated from between 1070 B.C. to 395 A.D. The samples including hair, skin and muscle were taken from the head and abdomen. Bone tissue was also taken from the skull. All tissues were pulverized and dissolved in NaCl solution, homogenized, and centrifuged. A portion of the supernatant was extracted with chloroform and dried and then dissolved in a phosphate buffer. Samples were then measured by both radioimmunoassay (Merck; Biermann) and gas chromatography / mass spectrometry (Hewlett Packard) - hereinafter GCMS. "

"This is the procedure used to produce what McPhillips (1998) considered indisputable evidence for confirming products of substance abuse in hair. Within recent years, hair analysis has been used more commonly in this kind of screening process and the techniques employed have been optimized. Mistakes are known to have occurred in some cases evaluating for metals, but the ability to detect drugs such as cocaine, nicotine, and hashish seem not been problematic (Wilhelm, 1996). The two possible mistakes in analyzing hair for drugs include false positives, which are caused by environmental contamination; and false negatives, where actual compounds are lost because of such things as hair coloring or perming. In recent years, these techniques of hair analysis have revealed the interesting findings of arsenic in the hair of Napoleon Bonaparte, and laudanum in the hair of the poet Keats. "

"The procedure includes a thorough washing of the hair to remove external contaminants followed by a process of physical degradation using a variety of methods (such as digestion with enzymes or dissolution with acids, organic solvents, etc.). Following these preparatory procedures, the hair is then analyzed. Antibody testing (e.g. radio immunoassay) is a well-established procedure although there is small potential of obtaining false positive results. These are mainly caused by the cross-reactivity of the antibody with other compounds, including minor analgesics, cold remedies and antipsychotic drugs - compounds not likely to be found in Egyptian mummies. Because of the possible false positives, chromatography (GC-MS) is routinely utilized to confirm the results. "

"The suggestion of nicotine contamination from cigarette smoke is eliminated by the use of solvents and/or acids in the cleaning process - methods used by Balabanova et. al. and all other researchers that have documented drugs in mummies. "

"The validity of Balabanova's findings seems to be vindicated at least so far as the analytical methods used in the study. The authors' methods as well as those in the additional findings reported here (see below) have used the combination of immunological and chromatographic methods to both analyze and confirm samples. "

Faked Mummies

"The argument that the mummies might have been modern fakes was investigated by David (Discovery, 1997). David is the Keeper of Egyptology at the Manchester Museum, and undertook her own analysis of mummies, independent of Balabanova's group. In addition, she traveled to Munich to evaluate for herself the mummies studied by Balabanova's group. Unfortunately the mummies weren't available for filming and they were being kept isolated from further research on grounds of religious respect. David had to resort to the

museum's records. She found that, except for the city's famous mummy of Henot Tawi (Lady of the Two Lands) the mummies were of unknown origin and some were represented only by detached heads. “

“David's inability to examine the mummies herself may have kept the possibility of faked ones open; however, her evaluation of the museum's records seemed to indicate otherwise. The mummies were preserved with packages of their viscera inside. Some even contained images of the gods. In addition the state of mummification itself was very good. The isolated heads may have been fakes (evidence one way or the other is lacking) but the intact bodies examined in Balabanova's research were clearly genuine. “

Chemical Changes

“The argument that the identified drugs might be byproducts of decomposition is highly unlikely. The argument appears to resemble a 'Just So' story of biochemical evolution without the benefit of natural selection. Schafer (1993) admits that natural decomposition or mummification has never led to the synthesis of cocaine or related alkaloids but leaves the possibility open anyway. He argues that the compounds in question might theoretically have been produced by atropine-alkaloid-containing plants (such as were present in species that were utilized in the mummification process). “

“The benefit of the doubt in this case clearly goes to Balabanova et. al. Until it is shown how cocaine could be produced in this way, the argument is hypothetical at best. “

Isolated Example

“The detection of drugs in human hair is a fairly recent endeavor (McPhillips, 1998; Sachs, 1998). A few compounds were identified during the 1980's but it wasn't until the 1990s that drug screening via hair analysis became accepted and used as a possible alternative to urine sampling. The criticism that no known cases of cocaine, nicotine, or hashish have been reported in human hair must, therefore be interpreted with clarification. None of these compounds had been observed in human hair because the process had not been fully developed, nor had the application even been considered until quite recently. Even then the claim is not true. “

“Cartwell et. al. (1991) using a radio immunoassay method detected cocaine metabolites in pre-Columbian mummy hair from South America. In this study two out of eight mummies analyzed showed cocaine metabolites. All samples tested were confirmed by a separate laboratory (Psychomedics Corporation, Santa Monica, California) using GC-MS. The two mummies testing positive were from the Camarones Valley in northern Chile. The artifacts as well as the mummies at this site were typical of Inca culture. “

“Since the initial work of Balabanova et. al., other studies have revealed the same drugs (cocaine, nicotine, and hashish) in Egyptian mummies, confirming the original results. Nerlich et. al. (1995), in a study evaluating the tissue pathology of an Egyptian mummy dating from approximately 950 B.C., found the compounds in several of the mummy's organs. They found the highest amounts of nicotine and cocaine in the mummy's stomach, and the hashish traces primarily in the lungs. These findings were again identified using both radio immunoassay and GSMS techniques. Very similar results were again found in yet another study by Parsche and Nerlich (1995). Again, the findings were obtained using the immunological and chromatographic techniques. “

“David's work (Discovery, 1997) though not finding cocaine, did confirm the presence of nicotine. This finding has seemed a little less threatening to conservative scholarship in that it seems possible (albeit unlikely) that a nicotine-producing plant may have existed in Africa within historic times - only becoming extinct recently. “

“Such a possibility might allow for a comfortable resolution to conservative scholarship but doesn't explain the evidence of cocaine. Additionally, the possibility of a native plant going extinct is unlikely. Much more reasonable would be that an introduced species under cultivation could go extinct, yet this only begs the question of the original provenance of the species. “

“In any event, considering the several confirmations of Balabanova's work (as well as that of Caldwell et. al. prior to her study) it appears that the argument against their findings based on too little evidence is quickly vanishing (if not already obviated). “

Pre-Columbian Voyages to America

“The major reason for the initial criticisms to Balabanova's work is the disbelief in pre-Columbian transoceanic contacts. Egyptologist John Baines (Discovery, 1997) went so far as to state, "The idea that the Egyptians should have traveled to America is overall absurd...and I also don't know anyone who spends time

doing research in these areas, because they're not perceived to be areas that have any real meaning for the subjects. " Another interpretation on why researchers haven't considered the subject closer is given by Kehoe (1998), "After mid-century, any archaeologist worried about money or career avoided looking at pre-Columbian contacts across saltwater [p. 193].." It appears that acknowledging that pre-Columbian contacts occurred was not academically acceptable. Kehoe (1998) also gives examples of several researchers whose work has been academically marginalized because it supported these views (e.g. Stephen Jett, Carl Johannessen, Gordon Ekholm, Paul Tolstoy, and George Carter). "

"Surprising at it may seem, evidence for early ocean voyages to America from the Old World is not lacking - nor is it negligibly verifiable. Within the last two years, two periodicals, focusing on these contacts have been established. The first, entitled Pre-Columbiana, is edited by Stephen C. Jett, Professor of Clothings and Textiles at the University of California, Davis; the second is entitled Migration and Diffusion and is edited by Professor Christine Pellek in Vienna, Italy. There is certainly quite a bit of spurious reports of early contacts from the Old World, however, a general disregard for all of the evidence is, anymore, itself evidence of academic negligence, as these two periodicals indicate. "

"A bibliography of these early contacts is given by John Sorensen (1998) in the first issue of Pre-Columbiana. It is a good example of the kinds of evidence being uncovered by legitimate researchers and institutions. The bibliography is itself a condensation of a two-volume work of these publications and includes titles such as: The world's oldest ship? (showing evidence for a pre-Columbian ship in America) published in Archaeology; Peruvian fabrics (showing very strong similarities between Peru and Asia) published in Anthropological papers of the American Museum of Natural History; Robbing native American cultures: Van Sertima's Afrocentricity and the Olmecs (showing evidence for connections between Africa and the Olmecs of Middle America) published in Current Anthropology; Possible Indonesian or Southeast Asian Influences in New World textile industries (showing at least three textile-related inventions that appear in both Indonesia and the New World) published in Indonesian Textiles; and, Genes may link Ancient Eurasians, Native Americans, published in Science."

"And the list goes on and on - some evidence being better than others - but as a whole it seems pretty much irrefutable. Claims to the contrary seem to be made by individuals with a vested interest in the isolationist position. The evidence, pro and con, when evaluated objectively, would seem without question, to favor the diffusionist position (which claims that pre-Columbian contacts took place). "

Considerations

"The initial reaction to the findings of Balabanova et. al. was highly critical. These criticisms were not based on a known failing in the authors' research methodology, rather they were attempts to cast doubt on an implication of the research - that cocaine and nicotine were brought to Egypt from the New World before Columbus. This conclusion is not acceptable to conservative investigators of the past. In fact it suggests a deep-rooted aversion to what Balabanova suggested might mean an unraveling of aspects of history contrary to basic reconstructions. This aversion, according to Kehoe (1998) stems from the conviction that Indians were primitive savages destined to be overcome by the civilized world - that the acme of evolutionary success resided in the conquering race itself. 'Childlike savages could never have voyaged across oceans.' "

"Balabanova's findings bring yet other evidence forward that humanity is not so easily pinioned into the pre-conceived notions of primitive and advanced - even as this might be related to the presumed technology of earlier times. The quest for discovery - to find new worlds - is not just a modern selective advantage of our species. Perhaps it is the defining characteristic. "

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