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LOSS OF FORENSIC INFORMATION DUE TO ENVIRONMENTAL SYSTEMS INTERACTION WITH BIOLOGICAL HUMAN SYSTEMS

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Abstract

External environment represents a permanent source of aggression factors that induce deviation from steady state of dynamic equilibrium, living systems. Physical factors of aggression consist of physical phenomena that can interact with biological processes. With that comes directly from a basic structural level (atomic and molecular), temperature changes influence through them all the functions of living systems. In terms of forensic putrefaction has a different rate of progress, depending on the ambient temperature, the amount of oxygen available in the environment, humidity, type of environment. Also, necrophore insects participate in the body destruction, it helps us to estimate time since death.

Key words: autolysis, skeleton, putrefaction, necrophores insects;

INTRODUCTION

Death leads to loss of homeostasis with the termination of functioning of human body as an alive cybernetic system. Destructive factors involved appear from the subcellular level and continue with prokaryotic organisms, and insects, mammals. Necropfore insects participate at body destruction, it helps us to estimate time since death. (Dermengiu, 2002) (Dermengiu, Curs de Medicina Legala, 2011) Also, environmental factors are involved such as heat, humidity, heat, cold or elevated chemical acids, bases, antimicrobial substances.

Putrefaction is a destructive process that can occur after a few hours or a few days after death. It consists of saprophytic bacterial flora progressively multiplying that invade the body through blood vessels. (Beliș, 1995)

Failure to quickly or adequately refrigerate bodies may also lead to early decomposition. Endogenous factors included fever, infections, illicit and prescription drugs, obesity and insulin-dependent diabetes mellitus. When these factors or conditions are identified at autopsy less significance

should, therefore, be attached to changes of decomposition as markers of time since death. (Zhou, 2011) (Byard R. W., 2008)

MATERIAL AND METHOD

We studied the cases of decay found in various stages of destruction and tried getting as much information about sex, age, height, race, setting range postmortem (forensic information) and recovery sequence about destructive factors involved that led to the current state of the biological system. (Sanbar, 2007) (Organization, 2001)

This paper want to reflect factors which the existing specialized literature, documenting the relation existing in the sample analyzed between time since death and the extent of postmortem change, which in the environments examined are distributed into the following phases:

- Phase 1 (putrefaction): one week to one month on the surface and two months in water.
- Phase 2 (initial skeletonization): two months on the surface and five to six months in water.
- Phase 3 (advanced skeltonization): six months to 1.5 years on the surface and 2.5 years buried.
- Phase 4 (complete skeletonization): about one year on the surface and three years buried. (Prieto, 2004), (Moriya, 2005) (Hollund, 2012) (Damann, 2013)

RESULTS AND DISCUSSION

We have established the role of intracellular enzymes involved in the first phase of destruction of the human body - autolysis, the destruction of cellular integrity, extracellular matrix and the fundamental substance.

The ultrastructural changes in the kidney, pancreas, liver, heart and skeletal muscle occurring postmortem in situ. In each organ, cell edema (cell swelling), appearance of amorphous dense deposits in the mitochondria, loss of glycogen granules, dilation of the endoplasmic reticulum, clumping and margination of nuclear chromatin, and/or condensation of nuclear chromatin were observed, but the duration of the period of ultrastructural change was organ specific. (Zhou, "Factors and processes causing accelerated decomposition in human cadavers–an overview.", 2011) (Sanders, 1967)

Fig. 1. Cardiac tissue with putrefaction modification

Most of the ultrastructural changes occurred earlier in kidney. In hepatocytes, the morphological degeneration occurred later than in the renal tubule epithelium and earlier than that in the myocardium. Of the five organs we examined, skeletal muscle showed the greatest delay in postmortem change. In the distal tubule epithelium and pancreatic acinar cells, two forms of nuclear change were seen: one resembled necrotic change and the other resembled apoptotic change. The effect of lysosomes and hydrolytic enzymes was not as great as previous findings. (Tomita, 2004) (Byard, 2015)

In the next destructive stage, the putrefaction, we revealed the microbes involved (anaerobic bacteria from the intestine, by emphasizing byproduct of metabolism thereof: hydrogen sulfide, respectively aerobii of the upper airways: traces of alcohol in the blood). (Thomsen, 1994)

We analyzed the waves of insects involved in the destruction of the body, we highlighted the destructive action of small and large mammals: rats, dogs. We analyzed the destructive factors of physical environmental factors: heat, humidity, frost.

Diversity of insects in the surrounding environment found five species that was present on cadavers: Chrysomya albiceps, Chrysomya megacephala and Cochliomyia macellaria (Calliphoridae), Oxysarcodexia riograndensis and Ravinia belforti (Sarcophagidae). C. albiceps was the most frequent species on the corpses. Species referred to as of forensic importance, such as Lucilia eximia, Chrysomya putoria, Oxysarcodexia modesta and Ophyra chalcogaster were present, but not on cadavers. There

seems to be a limited colonisation of cadavers at the scene of the death, despite the ubiquity of necrophagous species in the area. (Oliveira, 2010) (Carvalho, 2000)

Fig.2. Larvae at different stages of development.

The results contribute to differentiate between species that are involved in decomposition and those found in and around the mortuary installations, thus providing potential clues about the locality of death and the post-mortem interval (Schroeder, 2003) (Byrd, 2009)

CONCLUSIONS

As acting destructive factors listed above, the information obtained are imprecise, fewer, error margin higher, so the destruction of biological systems has a certain sequence, first losing nervous system, muscle, and the last human biological system resisting the destructive factors of the environment, is the bone of that information can be collected only by biological identity, possibly signs of violence.

From muscular system, we can obtain information on nutrition status, age, physical activity, health status, anatomical appearance.

The nervous system is the first to lose and can only get information on degenerative diseases (Alzheimer) or traumatic vascular pathology.

Bloodstream system, when you can analyze it, offers the most information about the pathology of death.

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