CASE NO. BIOL232
SUBJECT: MARTIAN MAMMAL DISSECTION PRELIMINARY REPORT
DATE PREPARED: 18 JANUARY 2106
PREPARER: DR. JASON FURBUSH, Ph-D, B.S., Sch-Mutz, T-BSr

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BACKGROUND

On 12 January 2106, a specimen was brought to my department for analysis, dissection, and evaluation. At first view, the creature bears striking similarities to small, rodent-like mammals commonly seen on Earth in several geographical locations, including high deserts, low deserts, forests, and plains. My plan for proceeding with the study of this "animal" will be to take several blood samples and subject them to testing, including erythrocyte count, leukocyte counts, and several protein electrophoresis tests. Afterwards, I will dissect the body so that I may evaluate possibilities into the animal's physiology. The details of the findings will follow. Upon completion of the preliminary dissection and blood tests, I inquired as to the location of where this specimen was captured and was told "high desert of Mars". A soil sample from the habitat was requested for further testing, and the reasons for this will be explained below, as I believe it will help in explaining the animal's physiology compared to its astonishing anatomy.

RESULTS

1. Dissection: Although most of the glands seemed comparative to Earth rodents, there were some surprising discoveries.

A. Thyroid Gland: Upon dissection, I found that the creature possesses nearly identical visceral organs to *Mesocricetus auratus* (a common Syrian hamster), in that the locations (the heart, lungs, bladder, etc.) are analogous. However, I've noticed that this creature has an unusually small thyroid gland, yet the parathyroid gland nodules (see section B below) seem to be of a size similar with the comparative anatomy of the hamster. Because of the animal's small size, I would surmise that the surprisingly small size of the thyroid gland is an evolutionary adaptation to its environment. To explain further, the thyroid gland is responsible for producing thyroid hormone (TH), which affects nearly every organ in the body to some degree, as well as regulates the basal metabolic rate (BMR). Because this animal's thyroid gland would not be releasing as much TH as other "rodents" of its size, I would speculate that this animal has an exceptionally low BMR and low body heat. In Earthen desert environments, a low BMR is somewhat normal for the indigenous animals due to a lack of water and to a lesser degree, other nutrients. I believe that because the Martian landscape is primarily devoid of moisture, evolutionarily a decrease in the BMR of the inhabitants to conserve fuel and energy would be required for survival. In this manner, the animals lowered metabolism would still enable survival in the absence of abundant energy resources such as ample food and water. The thyroid also plays a role in tissue growth and development, and skeletal and nervous development during the fetal and infancy stages of life, and so I would further speculate that during these growth periods, the animal's thyroid gland would be of a similar size to other (Earthen) animals during similar periods. It may, however, cease to grow or even shrink in size as the animal progresses to sexual maturity (sexual organs were also present and noted during the dissection). It would be useful to have a sexually immature specimen of the same species to compare with under this hypothesis, however. Females during pregnancy would no doubt require further energy needs however; as the energy required to produce thyrotropin-releasing hormone tends to increase with pregnancy. This hormone then stimulates thyroid stimulating hormone (TSH) and forces the thyroid to produce above "normal" amounts of TH for this animal, increasing the energy consumption and overall metabolism. It is possible that most of the foods and nutrients this species of animal consumes are stored solely for the purpose of bearing young.

B. Parathyroid glands: The parathyroid glands are usually very discreet and rest on the posterior side of the thyroid gland, but in this case, they were clearly visible even from an anterior aspect due to the small size of the thyroid. I mention them here only because of their relative size and location to the thyroid gland of this animal. The primary function of the parathyroid is calcium regulation in the blood and furthermore, stimulation of the parathyroid gland is triggered by falling calcium levels. This causes parathyroid hormone (PTH) to stimulate osteoclastic ("bone-eating") digesting of the bony matrix, releasing more calcium into the blood stream, which is required for muscle contraction and nervous system action potential generation. There seemed to be nothing more of interest from this organ, but it's relevance to the soil sample I've requested will be noted in Section 3.

2. Blood Tests: Although there were many blood tests performed, two specifically warrant mentioning.

A. Albumins: Electrophoresis of the blood plasma revealed an exceedingly high albumin count, roughly three times that of humans. As albumins in humans accounts for roughly 60% of the plasma proteins, to explain how an animal can have three times that number involves long, arduous *quantum-mechanical space-time dilation-compression neo-biophysical* calculations which deal with biophysical compression of bodily liquids (refer Dr. Evander Smetzvelt's work on the subject, circa 2079, which details how volumes over 100% may be reached, located in the World Health Institute archives), which is beyond the scope of this paper. Although there may be more than one explanation for this anomaly, the one which most readily comes to mind is that the albumin count is directly related to the animal's habitat and lifestyle. To explain, albumins are the proteins responsible for moving blood-bound molecules through the bloodstream, buffering the blood, and most of all, the major contributor to osmotic pressure. It is this pressure that keeps the erythrocytes free within the blood vessels rather than diffusing through the relatively porous vessel walls. In humans, a high albumin count would indicate dehydration, and in the case of this animal, I believe it indicates a natural habitat of exceedingly dry conditions, which is consistent with the explanation given to me by the NASA representatives upon delivering the animal ("high desert of Mars"). The high albumin content of the plasma would also be necessary for the high hematocrit (ratio of erythrocytes relative to total blood volume, also explained below) due to the increased blood viscosity that having such a high ratio implies.

B. Hematocrit: After subjecting 10mL of a collected blood sample to centrifuge, the plasma portion was drawn off, measured, and then subjected to electrophoresis to determine protein content (see above regarding these findings). The remaining erythrocytes were then measured and compared to the amount of plasma withdrawn, revealing the hematocrit (ratio of erythrocytes to total volume) was approximately 68%, about 1.5 times that of humans (it should be noted that normal human values for this ratio are closer to 45%). The reasons for this extremely high percentage demand additional testing to determine, but will be speculated as thus: Because erythrocytes are primarily responsible for carrying oxygen (at least here on Earth) via their high content of hemoglobin, the greater hematocrit, the greater amount of oxygen that can be transported through the bloodstream. This high amount of erythrocytes, however, seems to be a natural occurrence for this species of animal, and therefore I can only speculate that the animal's habitat in high altitudes with low atmospheric oxygen contributes at least in part to this. The animal's diet may also play a role in being able to maintain such a high ratio, as an equally large amount of iron is necessary to facilitate large increases in erythrocytes, and therefore increases in hemoglobin that require iron atoms in order to bind to molecular oxygen. Because a high hematocrit tends to tremendously increase the viscosity of the blood, the above noted high albumin accounts for keeping the blood in a more fluid state, rather than predisposing the organism to blood clots, clumping, and decreases in the amount of blood delivered to various body tissues.

3. Further Testing Required: As stated above, I have requested soil samples from the site of the animal's extraction. The reasons for this are to determine the mineral, moisture, and possible gas content of the animal's natural habitat. I believe that there may be high deposits of iron, calcium, and possibly traces of water that the animal may be drawing on for nutrition and hydration. High iron content in the soil would help explain the animal's erythrocyte count, while traces of water may explain the high albumin count in that the animal would still have enough water to survive, but not enough to lower the albumins maintaining the blood's osmotic pressure within the blood vessels in the absence of greater sources of water. I also anticipate calcium deposits in the soil, as the animal's parathyroid gland seems "normal", indicating that there is neither a deficit nor over-abundant in the animal's diet. Unless vegetation has become commonplace above the sands in the Martian desert, I would surmise that the animals feed off subterranean tubers and vegetative roots that have their own supply of nutrients and perhaps some little amounts of water and minerals gleaned from the soil. This would enable the animals to survive and consume nutrients without expending a great deal of energy to hunt for sustenance, all the while keeping their metabolism low. Calcium deposits in the soil may also help to explain how the animal gets enough dietary calcium to maintain a somewhat strong bone structure, and hence the "normal" sized parathyroid gland. Further physiological tests should be performed to confirm or disprove the above findings, as this is a preliminary report detailing only a few basic tests.