Woolly mammoths were cold adapted

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The common perception is that woolly mammoths were denizens of the cold who lived during the northern hemisphere glaciation.[1] However, some scholars have questioned whether they were truly cold adapted.[2] Even though they had thick hair and small ears, adaptations to cold, their hair would have needed oil to repel rain and snow. Soaked hair would be disastrous in a cold climate. As late as 1982, an analysis of woolly mammoth skin failed to find oil glands, known as sebaceous glands: modern elephants do not have these glands either.[3] New information has discovered that the skin of woolly mammoths indeed had sebaceous glands, and therefore woolly mammoths would not have had a problem living in a cold climate.

Warm climate mammoth hypotheses

The apparent lack of sebaceous glands is likely to have been responsible for the many hypotheses that place woolly mammoths in a warm climate that suddenly became very cold. Velikovsky advocated a pole shift from a passing planet, where a lower-latitude climate suddenly shifted to a higher latitude, thus freezing the mammoths to death.[4,5] Hapgood postulated a crustal shift from low to high latitudes to explain the demise of the woolly mammoths.[6] Walter Brown believes mammoths lived in a pre-Flood warm climate, but that those at high latitudes froze instantly and were buried in muddy hail at the beginning of the Genesis Flood.[7] A lack of sebaceous glands for cold adaptation probably helped spawn his hypothesis:

Figure 1. A typical illustration of a woolly mammoth, which had three types of hair. The outside hair was up to one metre long. Besides woolly mammoth skin having had oil glands, it was also discovered that the hair had adaptations for the cold.

> "Mammoth and elephant skin are similar in thickness and structure. Both lack oil glands, making them vulnerable to cold, damp climates. Arctic mammals have both oil glands and erector muscles—equipment *absent* in mammoths [emphasis in original, references deleted]."[8]

Recent research indicates woolly mammoths adapted to cold

Recent research has shown that woolly mammoths did have sebaceous glands.[3,9] One of the reasons presented to explain why these glands were not observed before is that the sample skin was too dry.[3] Apparently, early researchers either had poor samples or poor methods of analysis. Repin *et al.* stated:

> "Here, we present a documentary proof of the presence of sebaceous glands in the woolly mammoth, *Mammuthus primigenius* Blum. … Thus, our study is a documentary confirmation of the presence of sebaceous glands in the hairy mammoth. Sebaceous glands are a sign of cold adaptation. The presence of sebaceous glands in mammoths is a convincing argument in the discussion of the question if mammoths really lived in cold climate zones."[10]

Further evidence pointing toward the woolly mammoth's adaptation to cold is in a microscopic analysis of their three types of hair. Extra rod-like medullae were found within the length of the outside hairs (about 1 metre long) of the woolly mammoth, as well as the woolly rhino. These medullae are likely to have strengthened the outer hair and helped it maintain its shape, trapping air, and resisting distortion.[9] Tridico *et al.* conclude:

> "These attributes probably prevented the long overhairs and coarsest guard hairs [middle layer of hair] becoming intertwined and/or matted. Matted hair is likely to be less efficient at channeling moisture/water and snow away from the body, which would have proved fatal in the depths of an arctic winter."[11]

Early decay of woolly mammoth carcasses

Tridico *et al.* also found some microscopic indications that the carcasses they analyzed had already started to decay before being frozen, providing evidence against the quick-freeze theory that was suggested in the early 1800s by George Cuvier.[1] The Birds Eye Frozen Foods Company had earlier concluded that the woolly mammoths must have been quick frozen at temperatures possibly as low as –100°C.[12] However, post-mortem banding near the roots of the hair, also called putrid root, had already occurred, revealing that the specimens of woolly mammoths that were analyzed underwent some degree of decay before being frozen. Evidence of insect activity in the form of bite marks and hair lice sacs on woolly rhino hairs reinforce the evidence of some post-mortem decay. Variable fungal damage was also observed in the hair. Skin slippage that occurs in the early stages of decomposition, also occurred.

We should not be too ready to accept the 'data'

The evidence favours the notion that the woolly mammoth was cold adapted and lived in the mid and high latitudes of the northern hemisphere during the rapid onset of the post-Flood Ice Age.[1] The rare woolly mammoth carcasses and other animals with flesh still preserved are more likely to have been frozen at modest rates, not instantly. A possible scenario could be the freezing of the animals during a dry, severe Arctic cold front with blowing dust that would bury or mostly bury them. Such conditions may have been characteristic of the end of the Ice Age.[13]

As creation scientists, we need to be aware of the pitfalls of evolutionary and deep time interpretations of data. Numerous paleoenvironmental deductions seem almost obligatory in technical articles about the past.[14] Occasionally, scientific data is erroneous, or the reported data is of too small a sample size, or may even have been selectively reported, which was part of the problem for the claim of no

sebaceous glands in woolly mammoths. Sometimes, an inappropriate conclusion is difficult to discern, as evidenced by the earlier reported lack of sebaceous glands in woolly mammoths. In such cases, and if there are contrary data, it may be necessary to defer judgment pending further studies. Nevertheless, creation scientists need to be able to adjust their ideas as further research becomes available.[15]

References

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12. Dillow, ref. 2, pp. 383–396.
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15. As an aside, I note that Velikovsy was good at pointing out the challenges uniformitarian scientists face in earth science. Unfortunately, he also had a penchant for exaggeration, and his mechanisms for catastrophes were implausible. One dealt with Mars and Venus moving through the solar system skimming the earth. Upon rereading *Earth in Upheaval* after 25 years, I was delighted to see how easily the observations that Velikovsky made could be explained by the Flood and the post-Flood Ice Age.