Finally, there is the insulting and senseless retreat of the ungodly into some acknowledgement of a "supreme being."

The atheists of the French Revolution were quite pleased to acknowledge a Supreme Being. In fact, I would think no man can retain his sanity who does not in some way assume a Supreme Being: there can be no order, no universe, no thought or reason without one.

The great question is, who is He?

There is only one answer: The Creator.

# PHYLOGENETIC DEVELOPMENT OF ADIPOSE TISSUE IN ANIMALS

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*A review of the supposed phylogenetic development of adipose tissue in invertebrates and vertebrates is presented. In invertebrates, lipid-storage tissue is absent in the sponges and coelenterates. There is some evidence of such tissue in Echinoderms, a speculated possibility in Annelids, Mollusks, Crustaceans and Arachnids, and well-developed tissue in Myriapods and insects; but no distinct adipose tissue in Cephalochords.*

*In vertebrates, the poikilotherms have only traces of adipose tissue, the liver performing a lipid-storing function. Fishes, amphibians, and reptiles have little or no highly developed white adipose tissue. Carnivores have very little white adipose tissue, while hibernating mammals have large amounts of lower-developed brown adipose tissue.*

*These observations do not correlate with the prediction of the mega-evolution model of a graded increase in quantity and quality of tissues with advancement up the so-called evolutionary ladder of life.*

## Adipose Tissue Generally

The occurrence of cells filled with lipid material varies greatly among the various branches of the animal kingdom.

Among invertebrates only arthropods have a distinct, individualize adipose tissue. The record shows that some primitive types of fat storage are found in few other invertebrate species.[1] This observation does not correlate with the prediction of the mega-evolutionary model that cells and tissues would develop from the very most primitive forms of animals to the very most complex forms culminating in the highest presumed product of mega-evolution, man.

If mega-evolution were the true explanation of the origin and diversity of life, this development of cells and tissues would be irreversible. Thus there would be some degree of uniform increase in complexity directly related to various grades of development of each animal group in the animal kingdom.

Any gaps of histological development or regression away from development would be counter to predictions of the mega-evolutionary model. But such gaps would correlate with the prediction of the creation model that the Creator created different animal groups for different purposes, and hence there would be distinct differences in their cellular makeup and function along with nonuniform increase in complexity.

The lack of a significant amount of observations of adipose tissue development among vertebrates certainly does not strengthen the case for credibility of the doctrine of mega-evolution.

Among vertebrates a well-developed subcutaneous lipid-storage tissue occurs only in homoiothermic animals.[2] The fact that there is no significant development of adipose tissue in cold-blooded vertebrates is never explained by mega-evolutionary scientists.

One would think that if mega-evolution were true, there would be a gradual upward development of adipose tissue among cold-blooded vertebrates starting with the agnatha and progressing upward through the placoderms, osteichthyes, amphibia and ending with the reptiles. Furthermore, there would be an accelerated but unique development of adipose tissue in both the warm-blooded classes of birds and mammals.

The stages of development of adipose tissue that occur in both invertebrates and vertebrates may be reviewed as follows:

### I. Invertebrates

**A. Sponges**—no evidence of any lipid storage cells.[3]

**B. Coelenterates (Cniderae and Ctenarae)**—no evidence of even a rudimentary form of adipose tissue. They even lack mesoderm *in toto*.[4]

**C. Echinoderms**—only starfish which have lipid-storage sites in their gastric caeca and sea-urchins which have epithelial cells with lipid-storage abilities show any resemblences to an adipose-tissue.

**D. Annelids**—The only indication of lipid-storing function in Annelids is contributed by Van Gansen,[5] who speculates that cholaragogenic cells of the coelomic wall peform this function.

**E. Mollusks**—According to Fontaine and Callamand[6] mollusks have only faint traces of adipose tissue.

**F. Arthropods**—As stated above, the arthropods are the only invertebrates that show a definite, individualized form of adipose tissue. Crustaceans and Arachnids have a hepatopancreatic system with only traces of adipose tissue. However, Myriapods and insects which lack a liver are the first invertebrates to demonstrate a significantly developed type of adipose tissue.[7]

**G. Cephalochords (Amphioxus)**—In this group there is no distinct type of adipose tissue. For invertebrates this appears to be a regression downward, from the complex development of adipose tissue of arthropods to the non-development of adipose tissue in Cephalochords.

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In summary, the devleopment of lipid-storage tissue in invertebrates starts with absence in the Sponges and Coelenterates, some evidence in Echinoderms, a speculated possibility in Annelids, Mollusks, Crustaceans and Arachnids, well-developed adipose tissue in Myriapods and insects and undeveloped adipose tissue in Cephalochords. This is, in realtiy, a sudden jump from nothing and faint traces to a well-developed, distinct kind of tissue followed by a regression downward in Cephalochords.

This certinly isn't the slow, upward development in quantity and quality that one would expect if the processes that are attributed to mega-evolution were in effect.

## II. Vertebrates

**A. Fishes:**

**1. Selachians**—There is evidence that the liver is the main organ of lipid storage. Hadjioloff[8] was unable to discover any adipose cells either under the skin or in the peritoneal cavity in dogfishes.

**2. Teleosts**—Fontaine and Callamand[9] found low lipid storage in Cod and fat storage in both the liver, muscles and subcutaneous connective tissues in eel. However, although adipose tissue does exist in Teleosts, in all instances, it contains very small quantities of lipid substance.

**B. Amphibians:**

**1. Urodele**—There is no evidence of subcutaneous adipose tissue in salamanders.[10]

**2. Anurans**—In frogs, adipose tissue is distributed in subcutaneous tissue, the chest and abdomen and bone marrow.[11]

**C. Reptiles**—The quantity and quality of adipose tissue in reptiles is essentially the same as in Amphibians.[12]

**D. Birds**—With the appearance of homoiothermy in birds and mammals, adipose tissue reaches its highest level of development. In birds the visible hepatic lipid stores vanish. Great amounts of subcutaneous white adipose tissue are found in penguins, albatrosses, ducks and chickens.

In the migratory birds, premigratory metabolic adjustments result in the facilitation of lipid stores in adipose tissue. Hence, these birds can undergo marked changes in body composition and weight depending on the time of year.

**E. Mammals**—Adipose tissue of mammals is found in three basic anatomical areas: under the skin, deep into the body and in the bone marrow.

**1. Pinnipedia and Cetaceans**—According to Owen[13] there is no intra-abdominal fat tissue but some lipid storage in areolar tissue among seals, sperm whales and true whales.

**2. Ruminants**—Certain of these animals store lipid material in specific localities for use during prolonged deprivation of food, e.g., the withers of some bovids such as the zebu, yak, the dorsal hump of camels and dromedaries and the fatty rump or tail of certain Asiatic or African sheep. These adipose reserves increase during the rainy season, decrease during the dry season, and during long excursions disappear more rapidly than other adipose stores.

**3. Carnivores**—Most carnivores have little adipose tissue under normal conditions.[14]

**4. Rodents**—Some rodents, such as the hare, have few or no fat-storage cells, but lipid material does accumulate in some cells of the domestic rabbit. According to Owen,[15] numerous rodents have their adipose tissue located primarily in the abdominal cavity.

**5. Hibernating Mammals**—In these animals some subcutaneous fat tissue persists, but much is stored in the abdomen. Fat may disappear, however, by the time of the spring awakening. Although there is some evidence of brown adipose tissue in insect-eaters, bats, rodents and some carnivores, this special type of adipose tissue reaches a high level of development in the hibernating mammals.

Brown adipose tissue is characterized by nuclei being centrally located with the lack of fusion of fat globules. There is more than normal amount of cytoplasm which gives a vacuolated appearance.[16] It is not as highly developed as white adipose tissue which looks like a signet ring with one large globule of lipid material surrounded by a thin margin of cytoplasm. The nucleus is squeezed to an edge of the white adipose cell by the bulging lipid globule in its center.

The type of fat cells in brown adipose tissue appear to be less developed in their lipid-storage ability, and hence may be called lower-developed cells. It is interesting to note that in the human embryo, brown adipose tissue appears at a very early stage (11 mm), later develops into white adipose tissue, but is totally absent in the newborn.

This pattern of development of white adipose tissue to brown adipose tissue to white adipose tissue in animals alledged to be advancing up the "tree of life" of the evolutionary model of origins certainly does not correlate with its prediction of simple tissues to complex tissues. In fact, this observation correlates rather nicely with the prediction of the creation model that different animal groups would have diverse quantities and qualities of certain tissue in order to serve totally different purposes intended by their Creator.

**6. Primates**—In this order of mammals, subcutaneous adipose tissue is atrophied, and in man develops side-by-side with the diminution of body hair. It appears that the less hair (fur) a mammal has, the more subcutaneous fat the organism accumulates.

In man, adipose tissue tends to accumulate more in the lower trunk (lower abdomen, sacrum and hips) than in the upper trunk. Fat distribution over the surface of the body follows familial and genetic patterns. The predispositon to become more or less android or gynoid is also determined by heredity. The fat cells in human adipose tissue are entirely of the white type which is the highest developed in its structure and function.

### Summary: Adipose Tissue in Vertebrates

In summary, vertebrates demonstrate a unique array of states of adipose tissue development. In poikilotherms, adipose tissue is scanty with the liver performing a lipid-storing function. The liver is dense with fat cells and largest when adipose tissue is least developed. Fishes, amphibians and reptiles have little or no highly-developed, white adipose tissue. In birds,

there is a big jump in the amount and quality of white fat cells.

In mammals, pinnipedia, cetaceans, and rodents have small amounts of fat tissue, ruminants and hibernating animals have abundant amounts of fat tissue, and primates a large amount of well-developed white adipose tissue.

Two observations are worth noting: 1) carnivores have very little white adipose tissue, and 2) hibernating mammals develop a large amount of less-developed brown adipose tissue. Both these facts do not correlate with the prediction of the mega-evolution model of increase in quantity and quality of tissues with advancement up the so-called evolutionary ladder of life.

### Conclusion

The above review of the developmental stages of adipose tissues in both invertebrates and vertebrates indicates that there is not a smooth upward development in quantity and quality of fat cells. There appears to be some general upward development, but it is broken with faint traces from highly developed to lowly developed levels. These differences in development appear abruptly and out of order of supposed progression.

It is suggested that if other scholars would examine more data in the disciplines of cytology, histology, and biochemistry, these data would be found to agree more with the predictions of the creation model of origin of matter and life, and to run counter to the mega-evolutionary model.

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[13] Owen, R. 1868. On the Anatomy of Vertebrates, Vol. 3 London: Longmans, Green and Company, p. 568.

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## PANORAMA OF SCIENCE

### When Does the Foetus Become a Human Being?

Two recent articles in the *Quarterly* had to do with the question just asked.[1,2] The conclusion was that there is no stage of development at which there is any reason to say that the foetus is not already a human being. The present purpose is to investigate the question a little more.

Aristotle and other philosophers have defined "man", i.e. "human being", as "rational animal". So rationality, either actual or potential, seems to be the point on which the answer depends. Since rationality is connected with the soul, the question may be turned into: "When does the foetus acquire a rational soul?"

It may be noted that Christian philosophers, such as St. Thomas Aquinas, identified "rational soul" with "immortal soul", at least as far as corporeal beings are concerned. So it may likewise be asked when the foetus acquires an immortal soul.

Aristotle, followed by the mediaeval philosophers, distinguished three kinds, or grades, of soul;[3] the term "soul" being understood in its widest sense, as "principle of life". There is the *vegetable soul*, which has to do with nourishment and growth. The *animal soul* adds to this the power of sensation. And the *rational soul* has moreover the power of reason.

The human being has all of these powers. But it does not follow that he has three souls. For the higher soul, the rational, has, as well as its own peculiar powers, the powers of the lower grades of soul.

It is necessary to distinguish also actuality and potentiality. A rational being is not necessarily always reasoning. At times the rational powers are only potential, i.e., available when called upon.[4] A writer has pointed out that every night, when we sleep, we lapse into potentiality.[5]

Again, a new-born infant has the rational faculty, for the most part, as a potentiality. But nobody denies that a new-born infant is a human being. So the foetus cannot be denied humanity because its rationality is still largely potential.

It is maintained, then, that the foetus acquires an immortal soul at the moment of conception. And the moment of conception is indeed a moment in time; it is the moment when the sperm cell and the egg cell unite to begin a new being. (See Reference 2)

The mediaeval philosophers, it is suggested, were hampered by insufficient information about the physiology of reproduction. St. Thomas, for instance, supposed that the semen somehow becomes the foetus; and did not know that there is a clear-cut point in time at which there is a new being. So he supposed that likely at first there is only a vegetable soul; then, as the foetus develops more, an animal soul; and still later a rational soul.[6]

I have heard it said that Aquinas suggested a certain time in the development at which the foetus first acquires an immortal soul; but I have not yet found such a statement in his writings. In any event, the