PHYSIOLOGICAL EVIDENCE FOR CREATION

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Received 23 October 1993; Revised 3 August 1994

Abstract

A brief review of the academic discipline of physiology is given. The similarities of design and function of organelles and organs are presented. The similarities between the negative feedback systems of household heating and cooling systems and our body's heating and cooling systems are presented. A comparison between the homeostatic functions of a giant airport and our body's hormone system is presented. The precise purposeful functions of six body systems are reviewed. A discussion on the evolutionary beliefs among physiologists and mechanism versus vitalism indicates that evolutionism is on unstable foundations. The exceptionally arranged and precisely operating physiological systems of the human body are indications of the creation of the human body by a Divine Designer and raise doubts whether these systems could arise by a chance, undirected upward development of function.

Although a few articles in the *Creation Research Society Quarterly (CRSQ)* (Brauer, O., 1970; Hamilton, H. 1985, 1991 and 1993; Kaufmann, D. 1974, 1983 and 1994; and McLeod, 1983) have covered some specific aspects of human physiology, the discipline of human physiology has not yet been adequately examined as to its relationship to the creation model. One exception to this sparse coverage of human physiology and evolution/creation is the Institute for Creation Research monograph *Our Amazing Circulatory System . . . by Chance or Creation* by Dr. Marlyn E. Clark in 1976. It is possible that many of the functional processes that occur in humans correlate better with the concepts of design and order rather than the concepts of randomness and disorder. The purpose of this article is to demonstrate the agreement between data from the academic discipline of human physiology and the conceptual framework of the creation model.

Physiology is defined as the study of the operations of the organelles, the cells, the tissues, the organs, the systems or the entire bodies of living organisms. It studies the "why" of their performances. It attempts to discover what processes are carried out and the mechanisms that cause these occurrences to happen. It is significant to note the word "cause" at this point. Physiologists, like creationists and evolutionists, are interested in the root causes of living processes. Because of this emphasis on causes by physiologists, sometimes physiology is referred to as "biophysics." At many universities much interdisciplinary work is performed between the department of physiology and the departments of physics and engineering. It is hoped that this paper can demonstrate that this concern for cause by physiology is directly correlated to the doctrine of creationism and is antithetic to the doctrine of evolution.

From Particles to People: Structural Levels of the Human Body

The human body has five different levels of organization increasing in size and complexity from atoms to cells to tissues to organs to systems ending with a total functional human organism (Figure 1).

1. The chemical level—at its simplest level the human body is composed of atoms, the basic units of all matter. There are about 100 different kinds of atoms, each labeled as an element. The most prevalent atoms in the human body are carbon, hydrogen, oxygen, nitrogen, and phosphorus.

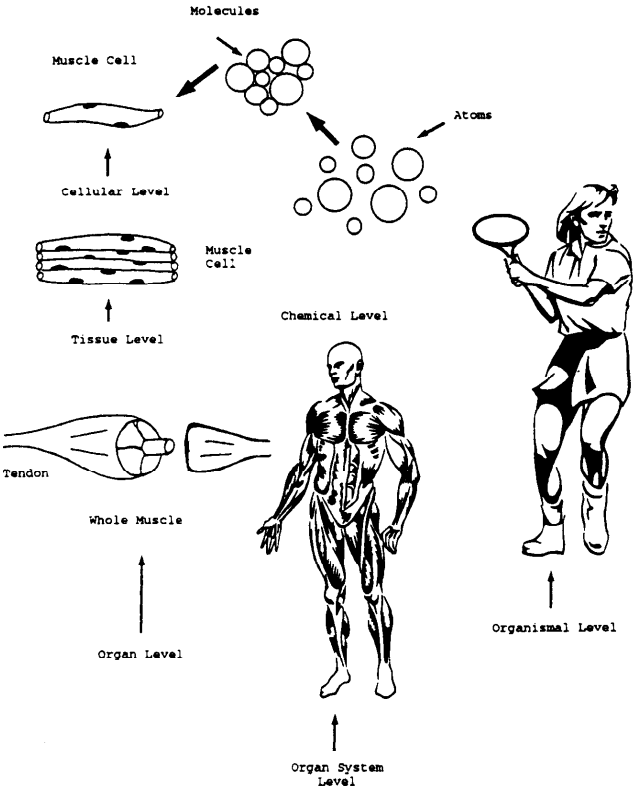

Figure 1. Levels of structural complexity in the human body.

2. Cells—These are the smallest, independent, protoplasmic units of life. They range in size from a sperm (5 micrometers long) to a nerve cell that may be up to one meter long. The main functions of cells are growth, metabolism, irritability and reproduction.

3. Tissues—These consist of many like cells that all perform a specific function. They are classified into four main groups: epithelial, connective, muscular and nervous.

A. Epithelial tissues are found in the outer layer of skin (epidermis) and in the linings of organs, blood and lymph vessels, and body cavities. They are essentially protective and some epithelial cells are designed for the release of special chemical messengers called

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hormones. Some of these cells have the ability to regenerate, i.e., when old cells wear out, new cells mitotically divide into two cells which replace the worn-out cells.

B. Connective tissues are found all over the body; the second layer of skin (dermis), between organs, as tendons, ligaments or aponeuroses (flat tendons), as fat, inside organs, as cartilage, bone and even blood and lymph. It is the most widely distributed tissue, and some of its cells can make strips of compounds called fibers (collagenous, reticular and elastic). Some of these cells can regenerate throughout life, i.e., bone and blood.

C. Muscular tissues have the ability to shorten and to pull on their attachments. Skeletal muscle attaches to and pulls on bones; smooth muscle acts on the digestive tube, eyes, blood vessels and some ducts; cardiac muscle is the thick, middle, contractile layer of the heart. According to Marieb and Mallatt "Skeletal and cardiac muscle fibers undergo no division after birth" (Marieb and Mallatt, 1992, p. 232) and therefore muscular growth from then on is an increase in the size (hypertrophy) of the cells one has.

D. Nervous tissue is found in the brain, spinal cord, ganglia and nerves. It reacts to various types of stimuli (changes in chemical environment) and transmits nerve impulses (electrical messages) from one area of the body to another. Nerve cells also, according to Marieb and Mallatt "do not divide. As the fetal neurons assume their roles as communicating links in the nervous system, they lose their ability to undergo mitosis" (Marieb and Mallatt, 1992, p. 298). Therefore, all growth in neurons (nerve cells) is an increase in the branches of the limited number of neurons one has.

4. Organs—These are integrated collections of two or more kinds of tissues that cooperate to perform a specific function. A good example is the stomach: epithelial cells (mucosa) line the inside of the stomach to lubricate and protect it with a slimy substance called mucus; smooth muscle cells contract and churn the food, breaking it down to smaller particles that are moistened by digestive chemicals (juices, enzymes); nerve cells transmit nerve impulses that start and coordinate the muscular contractions, and connective cells hold all the other tissues together.

5. Systems—These are groups of organs connected together to perform a significant body function. The respiratory system, for example, connects the mouth, nose, throat (pharynx), larynx (voice box), trachea (wind pipe), bronchi, bronchioles and lung cells so as to exchange oxygen and carbon dioxide between the air outside the body and the blood inside the body.

The Amazing Human Cell

When a single sperm unites with a single ovum, they form a new cell called a zygote. The zygote contains all the genetic material in its nucleus to grow, develop and differentiate into the approximately 50 trillion cells of a mature adult.

Virtually all medical texts and honest authorities agree that human life begins, not at birth, but at conception. Dr. Watson A. Bowes of the University of Colorado testified to the U.S. Senate Judiciary Subcommittee in 1981:

> The beginning of a single human life is from a biological point of view a simple straightforward matter—the beginning is conception. This straightforward biological fact should not be distorted to serve sociological, political or economic goals (Shettles and Norvik, 1983, p. 113).

Dr. Micheline Matthews-Roth, Research Associate at the Harvard Medical School also testified: "It is scientifically correct to say that an individual human life begins at conception" (Shettles and Norvik, 1983, p. 113). Likewise Dr. McCarthy De Mere, a practicing physician and law professor at the University of Tennessee testified: "The exact moment of the beginning [of] personhood and of the human body is at the moment of conception" (Shettles and Norvik, 1983, p. 114).

Scripture (Jer. 1:5, Ps. 51:5, Ps. 139:13) and science agree that the child before birth is a human being with potential for development—not a potential human being. Birth is not the beginning of life. It is only a change of residence for an already living, active human.

The cells that develop from this zygote truly are amazing. Cytologists (anatomists who study cells) divide cells into four basic parts:

1. Plasma membrane—this is a phospholipid bilayer of molecules that forms an outer boundary membrane that keeps the cell separate and distinct from its surrounding chemical environment. It acts as a selective mechanism that allows specific substances to enter and leave the cell.

2. Cytoplasm—this is the portion of the cell within the plasma membrane but outside the nucleus. The fluid part of the cytoplasm is called cytosol. Within the cytosol are living, functional, membrane-bound structures called organelles. Also interspersed within the cytosol are chemical substances called inclusions which are either nutritional components or stored products of cellular metabolism. Unlike organelles, inclusions are not permanent materials and are constantly being destroyed and replaced.

3. Nucleus—this is a dense, spheroid control center of the cell. It is separated from the surrounding cytoplasm by a sheet of molecules called a nuclear envelope. Within the nucleus are chromosomes which contain the genes that direct all cell activities.

4. Nucleoplasm—this is the chemical material inside the nucleus which contains a dense rounded mass called a nucleolus which contains a few chromosomes and serves as a maker of ribosomal subunits.

Organelles and Organs: Parallelism of Design and Function

Since there are larger organs in a body that perform some metabolic function for given systems in the body and smaller organelles in a cell that perform some metabolic function for mechanisms within the cell, one wonders whether there is some analogy of design and purpose between organs and organelles? Would not chance events over a long period of time result in great variation of design between a cell and an entire body? Would not a Divine Designer probably use a similar design for a cell and an entire body during a short, unique period of creation? The variation of design is logically associated with the concept of randomness of evolutionary doctrine while the similarity of design is logically associated with the orderliness of a Divine

Creator. Let us examine if there is any similarity of design and function between an organelle and an organ.

In Table 1 a comparison of structure and function between organelles and organs is presented. The cell membrane has similarities to the skin, the endoplasmic reticulum (ER) has similarities to the liver, the ribosome has similarities to all cells, the Golgi apparatus has similarities to glands, the mitochondrion has similarities to the muscles, the lysosome has similarities to lymphocytes, the peroxisome has similarities to the liver and kidney cells, the microtubule has similarities to axial bones, the microfilament has similarities to muscles, the intermediate filament has similarities to appendicular bones and the nucleus has similarities to the brain.

Although all cellular biologists would not agree that there are direct similarities between all these structures on these two different levels, one has to admit that there are some general, indirect, structural and functional resemblances for all 11 of these organelles and their corresponding organs and that a few of them, e.g., endoplasmic reticulum, lysosomes, microtubules, microfilaments, indicate specific, direct, structural and functional likenesses. Is it not possible that when more definite knowledge on the histochemistry of the organelles is discovered that this concept of parallelism of design between organelles of the cell and organs of an entire body will be further proven? Did not the scientist who named these living functional structures "organelles" also conceptually think of these structures as having some strong association in design and function with their counterpart organs in the body? Is not this evidence for parallelism of design between organelles and organs further correlation with the creation model? Would not random factors over a long period of time produce a disorganized pattern of design and function on both the cellular an gross levels? Would not there be great variability of arrangement and performance if the hodgepodge of the many chance factors of the evolutionary model were in operation over a long period of time. However, if a Divine Planner had to formulate a plan for both the cellular and body structures during a unique, short period of time, would not He probably use similar designs and processes on both levels? What engineer would not use the same general design and mechanical principles of the gears of an automobile motor on some lower level type of motor, e.g., the motor of a watch? He would be a fool not to utilize the same prototype of the higher level on the lower level. He would even be more foolish to wait for random factors to occur over a long period of time in the hopes of acquiring a similar or even better structural arrangement and functional performance for the lower level.

Table I. Comparison of Structure and Function between Organelles and Organs.

Organelle and Its Function	Compared to	Organ and Its Functions
1. Cell or plasma membrane—enveloping the cytoplasm that controls the inflow and outflow of materials to or away from the cytoplasm.		Skin, and outer covering of epithelium and connective tissue that controls a limited inflow and outflow of materials to or away from the body.
2. Endoplasmic reticulum (ER) types of membrane—lined tubes (rough and smooth), involved in protein synthesis and detoxification of lipid-soluble drugs.		Liver cells which process proteins and detoxify lipid-soluble drugs (alcohol and phenobarbital)
3. Ribosomes—small structures containing RNA and protein that synthesize other proteins. Some are free; others attach to ER making it rough ER.		All cells since they build and maintain the protein components of their structures.
4. Golgi apparatus—membranous vesicles stacked like hollow saucers that package and secrete proteins and membranes made by the rough ER.		Cells of endocrine and exocrine glands especially mucous cells of the digestive tract which secretes mucus.
5. Mitochondria—double membrane-bound structures which are the main site of oxidative operations and production of ATP, the fuel for muscular contraction.		Muscle cells—contractile units that split ATP which causes mechanical work (contraction).
6. Lysosomes—membranous sacs that secrete enzymes that disintegrate harmful biological molecules.		Phagocytic cells (lymphocytes) that degrade ingested bacteria and viruses.
7. Peroxisomes—membrane-lined sacs resembling small lysosomes that secrete enzymes that cover dangerous free radicals to hydrogen peroxide which is converted to harmless water and oxygen.		Liver and kidney cells which perform similar detoxification processes.
8. Microtubules—hollow tubes providing structural support in the center of the cell.		Bones of the axial skeleton (head, shoulder girdle, vertebral column, pelvic girdle) which give structure to the center axis of the body.
9. Microfilaments—strands of protein (actin and myosin) that slide inward causing a sarcomere (unit of contraction inside muscle cell) to shorten.		Muscle cells that shorten.
10. Intermediate Filaments—microfibers with a diameter between microtubules and microfilaments that resist forces in the outer part of the cell.		Bones of the appendicular skeleton (upper and lower extremities) which support the outer body parts.
11. Nucleus—large spherical structure containing nucleolus and genetic material (DNA) that controls cell's activities.		Brain (cerebral hemispheres, diencephalon, brain stem and cerebellum) which activates and controls all cells and organs.

The general and indirect similarities along with the specific and direct similarities between organelles in the human cell and organs in the human body correlate with the creation model of similar arrangements and processes which are brought about by the omniscient mind and omnipotent authority of a Divine Creator.

Negative Feedback Control and Homeostasis

Everyone reading this article is comfortable because the correct temperature that is just right in order to feel comfortable is maintained by the heating and cooling system of the building. We all do not completely understand how this operates, but we do know that some knowledgeable human engineer designed the heating and cooling system of our buildings based on some sound engineering principles. We know that this heating and cooling system did not come about by the owners of buildings waiting for chance factors to develop it over a long period of time.

A brilliant human mind planned the system, and highly skilled craftsmen built it into the building. The system that assures us that we will be adequately warm in winter and comfortably cool in summer is called a negative feedback mechanism. This series is called negative feedback, because it acts to minimize the difference between an actual temperature response and a desired, pre-set response. In such systems, the level of the temperature that one desires to control is sensed: it is sent to a contrasting device where comparison to the desired temperature is made, and if a

Table II. Relationship of Designed Structure to Purposeful Function in Various Body Systems.

System	Design Structure	Purposeful Function
Skeletal	Bursae (sacs filled with synovial fluid) interspersed between bones, tendons, ligaments and skin.	Reduction of friction due to rubbing of parts.
Skeletal	Inferior radioulnar joint capsule (ligament) designed to tighten and relax.	Allows for pronation (palm up to palm down) and supination (palm down to palm up) of radioulnar joint.
Skeletal	Thumb bones (metacarpals, phalanges) angled at right angle to bones of palm (metacarpals II, III, IV and V).	Allows for opposition of thumb (crossing over palm to touch little finger.)
Skeletal	Medial and lateral menisci (crescent shaped fibrocartilagenous structures) seated between the femoral and tibial condyles of knee joint.	Besides deepening the shallow joint surfaces of tibia, the menisci prevent side-to-side rocking of femur and tibia and absorb shocks transmitted to knee joint.
Skeletal	Anterior Cruciate (crossing) ligament of knee joint.	Prevents anterior sliding of tibia on femur when the leg is flexed and prevents hyperextension of calf about the knee joint.
Skeletal	Posterior Cruciate (crossing) ligament of knee joint.	Prevents forward sliding of femur or backward displacement of tibia. Both cruciate ligaments lock knees when one stands.
Skin	Lack of sebaceous (oil) glands on palms of hands and soles of feet.	Lubrication of these areas would cause slippage and loss of grip or footing.
Respiratory	Right primary bronchus is wider, shorter and more vertical than left bronchus	Right lung is larger (greater volume) than left lung and needs more efficient inflow and outflow of air.
Respiratory	Lung mass is framework of connective tissue containing many epithelial cells with elastic fibers.	Allows lung to easily inflate and deflate during inspiration and expiration providing greater exchange of gases (O_2, CO_2) with blood.
Cardiovascular	Atria (top, receiving chambers of heart) are small and thin-walled.	Allows for pumping of blood into ventricles (discharging hambers) with less pressure.
Cardiovascular	Left ventricle larger and thicker-walled than right ventricle	Left ventricle must pump blood to entire body (out of aorta) while right ventricle only pumps blood to nearby lungs.
Cardiovascular	Heart surrounded by double-walled sac (pericardium) filled with serous fluids.	Pericardium acts as a lubricating bag around expanding-contracting heart to reduce friction.
Cardiovascular	Red blood cells lose their nucleus and become biconcave discs.	Allows more room for more hemoglobin to pick up oxygen.
Cardiovascular	Capillary diameter somewhat larger than diameters of red blood cells.	Membrane of red blood cells are in contact with capillary wall which facilitates exchange of gases. (O_2, CO_2).
Immune	Spleen has elastic partitions and smooth muscle covering.	Can contract to add a small amount of blood to circulation when there is blood loss.
Digestive	Small intestine has finger-like processes (villi) which in turn have micro finger-like processes (microvilli) on them.	Greatly magnifies the absorptive area surface of small intestine.
Digestive	Small intestine has larger and thicker muscular wall than large intestine.	Small intestine must exert greater mixing, moving and absorbing than large intestine.
Digestive	Stomach is lined with hills (rugae) of mucous cells that secrete mucus.	Rugae increase surface area for absorption and protective mucus prevents gastric acids from digesting stomach's own wall.

difference is detected, a reaction is triggered to correct the difference in temperature. The following simple diagram (Figure 2) of a thermostatically controlled furnace in a typical house illustrates this point.

As one can see, someone pre-sets the desired temperature on the thermostat which is sent to a comparing device. A temperature sensor in the thermostat detects the magnitude of the temperature in the room and also sends it to the comparing device. If there is a difference between the actual temperature in the room and the desired, pre-determined temperature, an error signal is given which triggers the furnace either to kick-on or kick-off in order to reduce the discrepancy between the actual room temperature and the desired temperature as set on the thermostat. If the system is properly designed by an engineer and is soundly constructed by skilled workmen, room temperature can easily be held approximately constant at an optimal level in spite of great changes in the outside temperature.

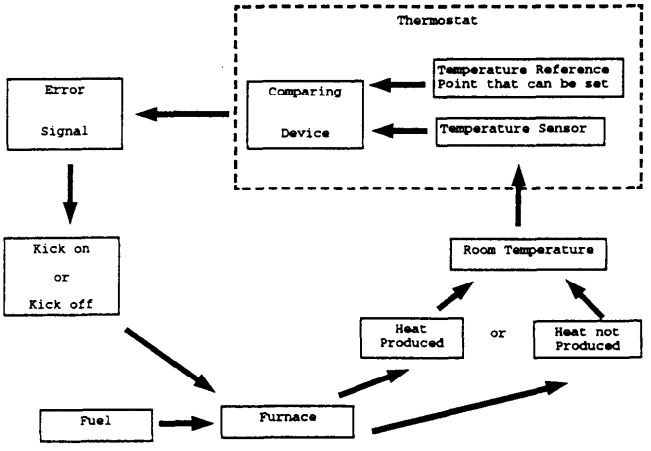

Figure 2. Diagram of thermostatically controlled furnace.

The thermostatically controlled furnace is just one of many examples of highly skilled minds planning a life-maintaining situation by use of a negative feedback control system. Other examples would be missile guidance systems, automatic airplane pilot control systems and various servomechanisms in industrial automation.

It is apparent to physiologists that for the body to survive it must somehow preserve life-maintaining environments for its organelles, cells, tissue, organs, and systems. This process of maintaining life-maintaining environments is called homeostasis. Homeostasis literally means "always the same state." Its technical definition is: "a state of inner balance and stability in the body, which remains relatively constant despite external environmental changes" (Carola et al., 1990, p. 613). In other words, for organelles, cells, tissues, organs, or systems to carry on their normal functions, their internal chemical environments must be held constant at an ideal operating level. A prime example in the human is the maintenance of our relatively constant average core temperature of 37°C. According to Powers and Howley:

> An increase in body temperature above 45°C (normal core temperature is approximately 37°C) may destroy the protein structure of enzymes, resulting in death, while a decrease in body temperature below 34°C may cause a slow metabolism and abnormal cardiac function (arrhythmias). (Powers and Hawley, 1990, p. 252).

The following simple diagram (Figure 3) of the hypothalamic-controlled core body temperature in the human body illustrates this example.

In the hypothalamus of the brain a pre-determined ideal core body temperature for homeostasis is sent to a comparing nucleus along with the actual core body temperature that is picked up by a temperature sensor. If there is a significant difference, an error signal of too hot or too cold is relayed to an anti-rise center (nucleus) or anti-drop center (nucleus) respectively. All these postulated structures are located in the hypothalamus, a conglomeration of nuclei group of nerve cells in central nervous system) in the diencephalon of the brain. If the anti-rise center is stimulated, it activates the sweating and vasodilation mechanisms (opening of blood vessels) which releases heat to the environment and decreases heat production in the body. If the anti-drop center is stimulated, it starts the shivering and vasoconstriction mechanisms (narrowing of blood vessels) which preserve heat and produce heat in the body.

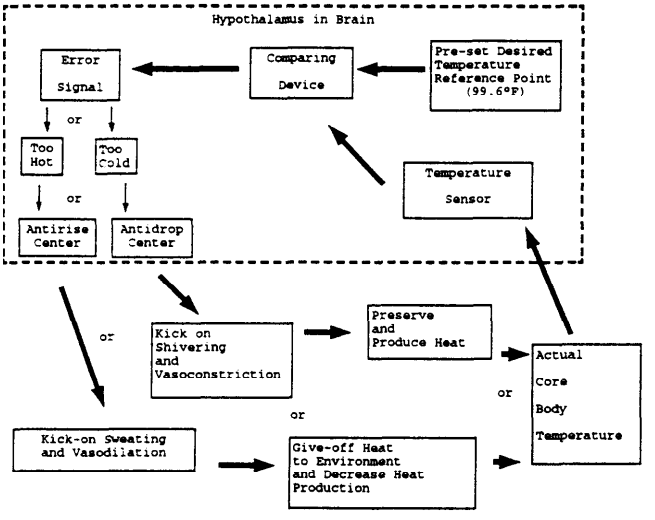

Figure 3. Diagram of hypothalamic control of core body temperature in the human.

Here is an example of the negative feedback control system in the human body. Its arrangement and function are very similar to that of the thermostatically controlled household furnace. It is obvious that core body temperature is not the only example of a negative feedback control system that regulates an optimal life-maintaining situation in the human body. Other examples are: blood pressure, blood glucose concentration, electrolyte concentrations, oxygen and carbon dioxide levels in the blood, muscle tone, etc.

A few questions are now in order. Since it took the skillful human mind of an engineer with a constructive purpose to plan and develop the many negative feedback control systems of our household heating and cooling systems, remote control systems and servomechanisms of industrial automation, is it not logical to believe that some Divine Planner designed and made functional the similar negative feedback control systems of heat regulation, blood pressure, blood glucose

concentrations, electrolyte concentrations, and muscle tone in the human body. Is it not far-fetched to believe that since the negative-feedback control systems in our houses and industry *did not* arise by chance/environmental factors occurring over a long period of time in recent history that the negative feedback control systerns in our bodies *did* arise by chance/environmental factors occurring over a speculated long period of time in ancient history?

The evolutionist has a real dilemma. Either he must provide evidence for chance development of these systems over a long period of time or he must believe something that is logically inconsistent with the development of these systems in our real lives during modern history. The former solution is scientifically untenable for there is absolutely no evidence in existence to prove a chance development of negative feedback control systems in our houses or in our bodies. The later solution is illogical and anti-intellectual for it is inconsistent with what has happened in real life during modern history. The only recourse for fair-minded individuals is to accept the logical deduction that the many precise operating physiological negative feedback control systems in the human body were produced by a Divine Engineer Who methodically arranged their structures and systematically made operational their functions to insure efficiency and health throughout life.

Hormonal Control of Homeostasis

The example of maintaining a relatively constant 37°C core body temperature in humans is one in which the nervous system is the biological control system that is used. Another fascinating example of a negative feedback control system in the human body is the regulation of hormonal activity. Hormones are "messenger molecules that are released by endocrine glands and travel in the blood to regulate specific body functions" (Marieb and Mallatt, 1992, p. 722). The ensuing discussion will elaborate how hormones provide for the best level of internal chemical environment for many of our metabolic cells.

The endocrine gland system was once thought to be an independent system, but we know that the endocrine system is coordinated with the nervous system, and physiologists now refer to it as the neuroendocrine system. The following diagram (Figure 4) of the control of endocrine glands and target cells by the integrative system illustrates the overall situation.

Before we proceed through an explanation of the diagram, the key must be fully understood. A plus stands for facilitation, i.e., increase in function due to stimulation. A minus stands for inhibition, i.e., a decrease in function due to stimulation. A dotted arrow stands for transmission by an electrical nervous impulse. A dashed arrow stands for transmission by a combination electrical and hormonal modality. A lined arrow stands for transmission by a hormone.

It was previously thought that the pituitary gland was the control center of the endocrine system, because it secreted a total of nine hormones that influenced other glands and target cells. For this reason, it was called the "master gland." Now it has been discovered that the hypothalamus, a specific collection of nuclei in the diencephalon of the brain, controls not only both

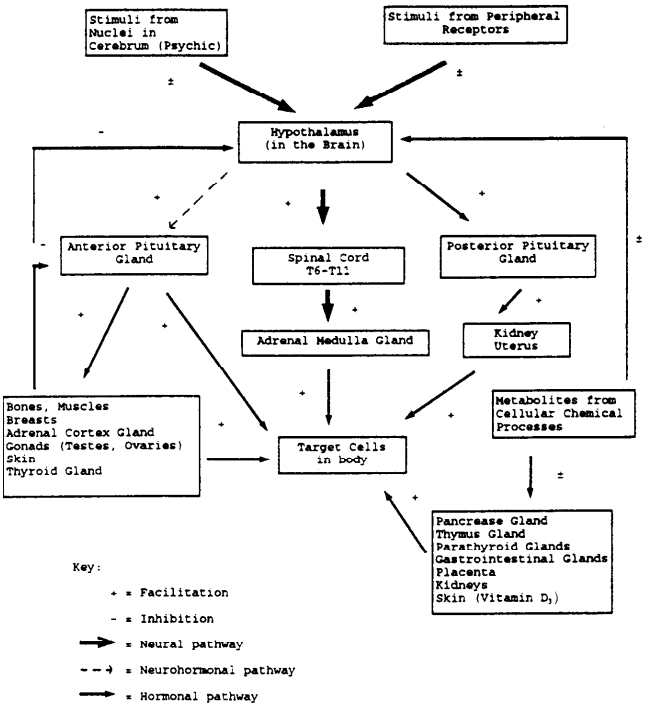

Figure 4. Control of glands and target cells by the integrative system.

the anterior and posterior pituitary glands but also the adrenal medulla glands.

Since the anterior pituitary gland controls by its secretion of specific hormones four target glands—the thyroid the adrenal cortex the testes, and the ovaries (along with a host of target cells in the bones, muscles, breasts and skin, plus the kidneys and uterus and some other target cells). The hypothalamus is now thought of as the "chairman of the board." After receiving chemical advice (physiological input) from the board of directors (nuclei in the cerebrum, peripheral receptors, target glands, and metabolites in the blood), the hypothalamus determines if there are deficiencies in any of the local businesses (glands or target cells), and either facilitates or inhibits activities there to keep the businesses financially in the black (metabolically living). Thus the hypothalamus acts as a compact integrating headquarters, receiving information neurally, hormonally or chemically from all areas of the body and it sends facilitative or inhibitor messages by nerves and hormones to keep the functional situations under control and at a healthy level.

Here is another wonderful example of a negative feedback control system in the human body. It is analogous to a giant airport operation. The head control tower receives information from the weather stations plus the incoming and outgoing planes. It constantly computes all these data into a complex system that provides the control tower operators with the necessary information for making wise decisions for the safe taking-off and landing of all planes. This system keeps the airport in an optimal functional state, i.e., planes safely arrive on time and planes safely depart on time. In other words, the airport maintains a state of desired homeostasis.

This example of airport control is very analogous to glandular control in the human body. Since it took a

number of intelligent airport experts with past experience in airport operations to develop this highly structured and efficiently operating system of negative feedback airport control, is it not logical to believe that some intelligent, supra-human Power designed and made operational the highly efficient and life-sustaining control of the glands and target cells in the human body? If chance physicochemical forces could not develop our negative feedback airport control system during modern history, how could physicochemical forces by random methods develop our highly organized and precisely coordinated glandular negative feedback control system regulated by the hypothalamus over a speculated long historical period of time? The argument here is definitely in favor of creation (with its concepts of design, order, plan, system, and harmony of operation) and against evolution and its concepts of randomness, disarray, disorganization, and chaotic operation.

The Safety Mechanism of the Reflex

Many people today fear the threat of a fire to their homes. Because of this threat of fire to their homes while sleeping, some have attached smoke detection devices to their houses. When the device detects the presence of smoke in the house, an alarm goes off which awakens the sleeping members of the household so they can flee the burning building to safety. This is just one of the many safety type devices developed by skilled engineers to provide a means of escape for persons in danger.

A reflex in the human body acts in same way. A reflex is an involuntary neural response that provides a safeguard against destroying one's tissues. Basically a nerve-ending receptor picks up some detrimental chemical change acting on some cells and sends a message to the spinal cord or brain urging them to elicit a motor response that will take away the threat of cellular damage. The spinal cord or brain receives this information and automatically sends a message to some effector (muscle or gland) to perform its function so that tissue safety can be maintained.

Many examples of a reflex could be given. Putting one's hand on a hot stove or sitting on a tack are typical illustrations. If a nerve ending receptor did not detect the extreme heat of the stove or the piercing pain of the tack and tell the brain to do something about it, much tissue would be damaged and considerable pain would be endured.

These situations are quite analogous to the smoke detection devices that prevent bodily harm to sleeping persons in a burning house. Since the safety mechanisms in our houses were designed and constructed by intelligent engineers and craftsmen, is it not logical to believe that the many reflexes that protect our body tissues from destruction were formulated and developed by an intelligent Creator Who desired to protect His highest form of creation? Could the many precise working superficial, deep, visceral, and pathologic reflexes in our human bodies have developed by biochemical processes operating by random methods over an unknown period of time? Such a uniquely arranged and harmonious operating safety system in the human body is further indication of a divine plan for precise functioning and opposed to a chance gradual development of the human body to a higher organized state.

Other examples of safety mechanisms in the human body that are better explained from a creationist viewpoint are the contraction of the spleen with its subsequent discharge of hemoglobin-rich red blood cells to maintain optimal blood volume homeostasis during exercise, hemorrhage or hypoxia (decreased oxygen in the blood) and the secretion of the hormones, epinephrine and norepinephrine, from the adrenal medulla glands to provide for suprahuman strength or energy during an emergency.

Magnificent Design of the Human Body

Our automotive engineers try each year to perfect new automobiles into the best possible running machines. Yes, our automobiles are getting better and better, but they will never approach the "ultimate machine," the human body. The healthy human body is designed so well and functions with such precision that human physiologists will never fully understand how superlative it is. Each decade scientists discover new bodily functions based on the well designed structures of the human body.

Table II portrays 18 basic designed structures from six body systems that show the relationship of unique design to precise, purposeful function. Various designs of structures in the skeletal, skin, respiratory, cardiovascular, immune and digestive systems attest to the remarkable, purposeful functioning of these structures. Could any of these designs with precise functions have originated by non-directed, physicochemical forces causing particles to fall together into such developed structures? To reproduce order out of disorder, code from non-code, and program from non-program, one needs energy—directed energy. Order never arises out of disorder, unless energy is somehow directed by an outside power. Directed energy has to be pumped into the chaotic chemical materials so that ordered chains of new designs of substances result. Codes and designs with precise function presuppose an intelligent Power behind them. To the author, the magnificent designs and precise function of human body parts are clear indications of a supernatural intelligence behind human life.

Are Physiologists Evolutionists?

In surveying a list of 17 basic texts in physiology only four references to evolution were found. This may indicate that many physiologists do not consider evolution as a critically important principle to this field of study. Crouch (1965, p. 22) made a neutral reference to "Organic Evolution" as the "history of the race," but this was merely to introduce the classification system of organisms. Two references to evolution are made in *Physiology* edited by Ewald E. Selkurt. One of the contributors, Sidney Ochs, in discussing the general properties of nerve states: "The fundamental plan of the higher life forms made its appearance very early in evolution" (Selkurt, 1963, p. 18). Another contributor, Carl F. Rothe, in discussing the role of the autonomic nervous system, asserts: "The human body has a large number of negative feedback systems, all perfected through evolutionary development" (Selkurt, 1963, p.

155). This latter statement certainly takes issue with the main thrust of this article.

Astrand and Rodahl, two world renown exercise physiologists, make two references to the "evolution of higher organisms" in their classical text, *Textbook of Work Physiology* (Astrand and Rodahl, 1970, p. 3). *Human Physiology* by Vander, Sherman and Luciano, emphasizes the evolutionary model of the origin of life. They attribute all phenomena to evolutionary development. They maintain that "Evolution is the key to understanding why most bodily activities do indeed appear to be purposeful" (Vander et al., 1970, p. 5). Here is an attempt to associate teleology, the explanation of processes in terms of purpose, with the physicochemical changes due to natural laws. This brings up the conflict between mechanism and vitalism.

Mechanism and Vitalism

Mechanism in the philosophical sense means that all operations of living organisms are explained by the interrelationship of physicochemical forces. The opposite view, vitalism, means that programmed operations of living organisms are performed by some life principle distinct from physicochemical forces. Vander and others make some interesting comments on these doctrines (Vander et al., 1970, pp. l-2):

> The mechanist view of life holds that all phenomena, no matter how complex, are ultimately describable in terms of physical and chemical laws and that no 'vital force distinct from matter and energy is required to explain life. This view has predominated in the twentieth century because virtually all information gathered from observation and experiment has agreed with it. But vitalism, its opposite, is not completely dead, nor is it surprising that it lingers in fields (like brain physiology) where we are almost entirely lacking in hypotheses to explain such phenomena as thought and consciousness in physicochemical terms. We believe that even these areas will ultimately yield to physicochemical analysis, but we also feel that it would be unscientific, on the basis of present knowledge, to dismiss the problem out of hand, . . .

It is apparent that the doctrine of mechanism is foundational to the evolutionary model of the origin of life and the doctrine of vitalism is associated with the creation model of the origin of life.* Note what Vander and others have said. They claim that the mechanistic view predominates in this century, because the evidence has agreed with this view, and that vitalism still exists in various forms. They are willing to concede creationism has some rights to exist as a possible option. However, they confidently feel that vitalistic thought will soon be intellectually annihilated in the near future.

*Editor's note: There is considerable difference of opinion among creationists on the historic vitalism-mechanism debate. Some, like Harold Armstrong *(CRSQ* 21:78), Robert Kofahl *(CRSQ* 26: 12-14 and 28:146), and L. McCann *(CRSQ* 27:151), would agree with David Kaufmann that historic vitalism should be resurrected as an appropriate stance for creationists. Others defend a God-centered mechanistic philosophy in which each biological system is viewed as one of the Creator's "living machines" involving great complexities of physics and chemistry but no "vital spirit," as such—see Richard Lumsden, *CRSQ* 30:63, and his printed debate with McCann.

Is this not the new psychological trend among evolutionists? They admit that evolutionary doctrine has enjoyed the belief of the majority of peoples both scientist and lay people alike, during the 20th century, but they admit that creationism has not been intellectually destroyed and has a loyal following with a minority of scientists and people. There is a grudging admittance that creationism deserves the right to exist as an intelligent alternative for one's personal belief, but they hope in due time it will be completely demolished from a scientific standpoint.

Many of the recent evolution-creation debates on our college campuses have indicated that the evolutionists are not as scientifically secure in their positions as they thought they were. When creation scientists are correlating recent data with the creation model of the origin of the universe, and evolutionists are having trouble correlating the new and even some of the old evidence with the evolutionary model of the origin of the universe, this is generating strong reactions from certain segments of the scientific community. What is needed is for creation scientists not only to believe, teach, and confess their creationistic beliefs in their classrooms, but to publish scientific articles and textbooks in their respective fields interspersing their creationist view just like Vander and others have done in their text such as *Human Physiology*.

Summary

A brief review of the academic discipline of physiology, the study of the operations of the organelles, cells, tissues, organs, systems and entire bodies of the human, has been presented. The evidence of parallelism of design and function between organelles and organs, negative feedback control and homeostasis, hormonal control and homeostasis, the safety mechanism of the reflex and other magnificent designs in the body is better correlated with the concepts of design and order of the creation model of the origin of life and is diametrically opposed to the concepts of randomness and disorder of the evolutionary model of the origin of life.

A discussion on the amount of evolutionary belief among physiologists and mechanism versus vitalism indicates that the traditional arguments for evolution are on shaky grounds. The exceptionally arranged and precisely operating physiological systems of the human body are persuasive indications of a divine creation of life on earth and militate against a chance gradual upward development of life on earth over a speculated long period of time.

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BOOK REVIEWS

Catastrophe Reference Database edited by Steven A. Austin. 1994. Master Books. Colorado Springs, CO. $24.95.

Reviewed by Emmett L. Williams* and Glen W. Wolfram**

The author of *Catastrophes in Earth History*, with help from other creationists, has collected considerable material on catastrophic natural events and their importance in understanding the geology and topography of the earth. What is a catastrophe? Austin, in his introductory remarks to the database, states:

> A catastrophe may be defined as a natural event of large magnitude (energy), short duration (power), wide-extent (area), and low frequency (probability) Because a catastrophe is a natural event which can be characterized by energy, power, area and probability, its study lies within the domain of geology and can be described using principles of physics.

Key words can be used to find abstracts of scientific writings on catastrophes within the database. For instance under the key word "cavitation," five abstracts can be printed. Also an abstract (no. 267) on the rapid petrifaction of wood in water glass (sodium silicate) solutions is available. This abstract could be utilized with the recent series of articles in the Quarterly on that topic. The first 249 abstracts are placed under subject headings and were included in Dr. Austin's book, *Catastrophes in Earth History*, available from CRS Books.

The system requirements for a person to be able to employ the database are as follows:

> MS-DOS and/or Windows 3.X
> 3½ inch hi-density disk drive
> Hard drive recommended
> Printer in a parallel port
> Can be used with Macintosh, Apple II, Amiga, and Atari—database file will need to be imported into a wordprocessing program for browsing and searching.

The file CATASTRO.TXT is written in ASCII code. There is also a card provided to be mailed back to Master Books so that the user will be notified of all software upgrades.

Dr. Austin and those who worked with him are to be congratulated on placing this vital information in a form that requires small storage space and is potentially quite useful. Dr. Austin is one of the pioneers in his field that has stressed the importance of catastrophism as opposed to gradualism in the history of the earth. If you would enjoy having access to references that refute the contentions of uniformitarian geologists, this database is what you need.

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How to Rescue the Earth without Worshiping Nature by Tony Campolo. 1992. Thomas Nelson Publishers. Nashville. 213 pages. $18.99

Reviewed by Kevin Colling*

This book offers many good suggestions on how Christians should practice greater stewardship with respect to environmental issues. However it is seriously flawed with an exegesis that comes close to "worshipping nature" (e.g.: the "salvation that John 3:16 talks about is for everything in the universe, not just for people" p. ix.) and poor scholarship (Campolo fails to substantiate claims of environmental disaster by saying that he doesn't "have to pound you with facts and figures" p. 2).

These perspectives combine to promote a worldview that does not seem biblical. The book openly advocates an environmental eclectic composed of a "host of ideas and beliefs that have come from sources as diverse as hard empirical scientists and Christian mystics" (p. 6). However, while attempting to appeal to hard empirical evidence that the environment is really facing a disaster (evidence which is never referenced), the book slams the very method by which any such evidence could be discovered and also by which any necessary solutions may be developed. The appeal to mystical Christianity is further discouraging and results in such unbiblical declarations as "I contend that not only should women be allowed to be preachers and teachers, but if the environment is to be rescued from destruction, men need to have women in such roles" (p. 194). There is a fuzziness in these arguments that fails to separate real science (the honest study of God's works) from fanatical science and to separate real Christianity (the honest application of Gods Word) from ecumenical emotionalism. Is the environmental "disaster" so important that we should rewrite God's Will in order to save it?

It is disappointing to find that Campolo has been duped by evolutionism and that he finds it necessary to work this false doctrine into his arguments:

> One of the consequences of Satan's work is that the evolutionary process has gone haywire. That is why we have mosquitoes, germs, viruses, etc. God did not create these evils. They evolved because Satan perverted the developmental forces at work in nature (p. 38).

He is convinced that "Through a perverted process of evolution, a mean and threatening spirit has become omnipresent in nature" (p. 42). This evolutionary premise also becomes a justification for arguing that Jesus meant animals to be included among the "least of these My brethren" (p. 51) as quoted from Matthew 25:40. Does this mean that animals are truly our equals, both materially and spiritually? Is not this the

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