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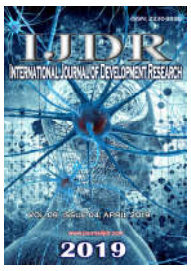

ORIGINAL RESEARCH ARTICLE OPEN ACCESS

HEAT GENERATION BY GUT FLORA METABOLISM AND HOST CELLS BIO-ENERGY FEEDBACK

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ABSTRACT

Cells, obtain energy from organic molecules, this energy is derived from the chemical bond energy in organic molecules to produce ATP and heat energy. In these growth independent reactions, energy sources were converted to heat energy. In the world, first time the energy of microorganism is absorbed, released or transformed one into another mechanism equation was discovered by Shagj J (Rolex awards *Jambalyn Shagj*: Heat generation and accumulation in the mammalian and human large intestine). Assumig the heat was spread over a 70 kg person and there was no heat loss, gut bacteria would raise body temperature by about 1.0 °C/h. The colonic epithelium drives 60%-70% of its energy from bacterial fermentation products such as acetate, propionate, butyrate, lactate, pyruvate. This phenomenon is called bio-energetics feedback of host cell and bacteria. The large intestine's lenght of approximate family of a mammifier is demonstrated that the adaptation potential in the thermo-situation. It depends on there are evolvement, chronologic factor, geographic condition and abruptness of weather.

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INTRODUCTION

The fossil record indicates that photosynthetic *eubacteria* were already in existence 3,5-4 billion years ago, so that the evolutionary events that transformed the ancestors of each the of the three major groups must have occurred over a relatively short time span early in the planet's history (Carl, 1990 and Ambaga, 2017). There are more close relationship between common descent of all life on Earth and long time formation of membrane - redox potential three - state line like structure from the cyanobacteria to Homosapiens during last 4,5 billion years, wich generated ATP and NADPH, heat energy (Ambaga, 2019). Cells obtain energy from organic molecules, this energy is derived from the chemical bond energy in organic molecules to produce ATP and heat energy (Ambaga, 2017). Early metabolism involved anaerobic oxidation-reduction reactions. Likely forms of early metabolism include sulfate respiration, light driven ion pupms, iron phototropy, and methanogenesis. The human gut is a dynamic environment in which microorganisms consistently interact with the host via their metabolic products. The production of heat by living bacteria is one of the transformations of energy brought about by these organism.

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The rise in temperature of organic substances undergoing bacterial decomposition has been called "thermogenesis" (Stanhope Bayne-Jones., 1928). Microorganisms, like all cells, produce heat as a byproduct of the enzymatic catabolism of substrate and synthesis of cell material. Some unfermentable and unabsorbed substances such as *Carbohydrates, pectins, cellulose* some oligosaccharides, unabsorbed sugars in the digestive system where the ATP maintain process and it had been formed last 4billion years. In the world, first time the energy of microorganism is absorbed, released or transformed one into another mechanism equation was discovered by *Shagj .J* (Rolex awards *Jambalyn Shagj*: Heat generation and accumulation in the mammalian and human large intestine,1989). The large intestine contains organisms belonging to over 30 identified genera and as many as 500 separate species or phenotypes. Approximately 10^{12} bacteria per g (dry weight) of colonic contents. The main types of bacteria in the colon are obligate anaerobes, and the most abundant bacteria are members of the genus *Bacteroides,* anaerobic gram-positive cocci, such as *Peptostreptococcus sp*., *Eubacterium sp.,Lactobacillus sp.,* and *Clostridium sp.*The role of these microbial communities in our evolution is a matter of considerable interest (Eugene Rosenberg, 2016 and Geraldine, 2008). The intestinal microflora makes important metabolic contributions to vitamin K, folate and short chain fatty acids, such as butyrate, a major energy source for enterocytes, and also mediates the breakdown of dietary

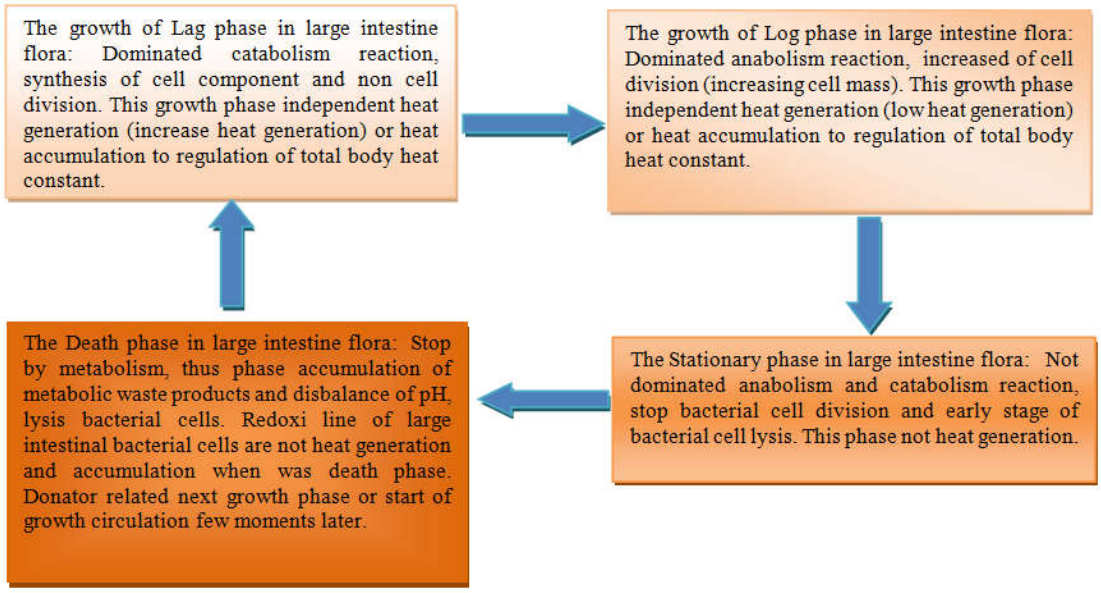

Figure 1. The generation of growth independent heat energy in large intestinal bacteria and cell division recycle

carcinogens. Any reaction in a living system is followed by heat production (Eugene Rosenberg and IIana Zilber Rosenberg, 2016; Geraldine O. Canny, 2008; Shagj, 1989 and George, 2011). Heat production by bacteria is related to their growth phases because the heat produced by bacteria is tightly coupled to their metabolic reaction. Heat output of bacteria is characteristic of the particular strain because the amount of heat produced by bacteria is affected by nutrients and the bacteria products and metabolic pathways (Eugene Rosenberg, 2016; Geraldine, 2008; Shagj, 1989; George, 2011). In these growth independent reactions, energy sources were converted to heat energy. Since 1 W=0.24 cal/sec, the average estimated heat production of gut bacteria, 168mW/g, would equal 0.0403 calsec per g bacteria. Thus, the human colon's resident bacteria, corresponding to cal. 300g dry weight bacteria (NIH Human Microbiome Project 2012), would produce about 12 cal/sec, or 43kcal/h (Eugene Rosenberg, 2016). Assumig the heat was spread over a 70 kg person and there was no heat loss, gut bacteria would raise body temperature by about 1.0 °C/h (Eugene Rosenberg, 2016).

The major sources of substrates for microbial growth and heat production in the mammalian intestines are complex non-digestible dietary carbohydrates and host-derived mucins (Eugene Rosenberg, 2016). Dietary substances in the colon are accumulated and formed in order to balance microbial ecosystem. Microbial ecosystem helps to balance physiological homeostasis of host cell. Microbial ecosystem is consists of nutrition absorption and transportation, water absorption, synergy some therapies. One of the most important systems of cell structure is the process of acid, alkaline flora which keeps homeostasis (Jonas Cremer, 2017; Kenji, 2013; 9.Joan, 2007 and Zehra Esra IIhan, 2017).

The *pH* varies from about 5 to 7 along the human colon with the type and abundance of fermentation products, bicarbonate secretion by colonic epithelial cells, and absorption of microbial metabolites by host epithelial cells. The pHs of the ascending *(pH 5,4-5,9)*and transverse *(pH 6,2)* colons are lower than those of descending and rectosigmoid colons *(pH 6,6-6,9)*The colonic epithelium drives 60%-70% of its energy from bacterialfermentation products such as *acetate, propionate, butyrate, lactate,pyruvate.*[6]

This phenomenon is called bio-energetics feedback of host cell and bacteria (fermentation reaction in large intestine by normal microflora it is redoxi line system). The growth phase of microbial in the intestine, and the growth phase and binary division factor regulating or modulation agent, is the host cell and microbial metabolic agents (intermediate compounds) of large intestine, their acidity and alkaline environment are balanced. The large intestine is a metabolic point of view of two major metabolic pathway such as aerobics and anaerobics respiratory, it is quite common in the middle of the environment, and in both of these bacteriallife conditions and balance to bacteria are created. Comparison of history the temperature of animal's body is much higher than their large gut. However the large gut has developed well, their body temperature is lower than their gut (Shagj, 1989 and Martin Jastroch, 2005). According to the comparison of self growth, the young animals that have great metabolism and they have higher temperature. Mammal's guts average temperature is more than 0, 8-4 C (Shagj. J., 1973). Mammal's close species large intestine gets big from equator to the north pole. It causes the geographical distribution of the animals. (Shagj. J., 1973). Thermoreceptor is very important in evacuation mechanism (Shagj, 1989). Young animals rectum temperature is higher than adult animals, also upper dots of the rectum has no difference. The animals that are fed by mother's milk can't have same large gut as adult animals because of bacterial oxidation- fermentation in the intestine (Shagj, 1989).

Conclusion

In summary, heat production by symbiotic microbes is a general phenomenon because all animals and plants contain abundant microorganisms and all microorganisms produce heat. Some of the body's heat is produced by the colonic microbial surroundings. The cell metabolism's very important and useful nutrients are fatty acids and organic acids are evolved to based on the bio-energetics line of the colonic microbes, which are used in the colonic epithelial cells also the heat produced in the large intestine.It is called that the bioenergitics's interaction or feedback of host cells and microbes. The large intestine's lenght of approximate family of a mammifier is demonstrated that the adaptation potential in the thermo-situation. It depends on there are evolvement,

chronologic factor, geographic condition and abruptness of weather. As well as the heat adaptation potential is regulated by large intestine's lenght and content, biocenose's specific character and bio-energetics's feedback.

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