

CYTO-ARCHITECTURAL DISPOSITION OF THE CEREBRAL CORTEX OF ADULT WISTER RATS TREATED WITH SAMIN YOGURT.

Uloneme Godwin Chinedu*

Department of Anatomy and Neurobiology, Faculty of Basic Medical Sciences, Imo State University Owerri, Imo State, Nigeria.

Corresponding Author: Uloneme Godwin Chinedu

Department of Anatomy and Neurobiology, Faculty of Basic Medical Sciences, Imo State University Owerri, Imo State, Nigeria.

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ABSTRACT

Background: Yogurt is a dairy food product produced by lactic acid bacteria in fermentation of milk. It is the most widely used fermented milk in the western world and many other countries, including Nigeria. **Purpose:** The study was done to investigate, and possibly determine the effect of yogurt on the cerebral cortex of adult wister rats. **Method:** Twenty four adult wister rats weighing between 180 and 200g housed kept in six separate cages labeled A, B, C, and D respectively and housed in Anatomy and Neurobiology Department, Imo State University, Owerri were used for the study. Each cage contained four female rats that were allowed free access to the normal rat chow and water. Group A that served as the control group was served only water and rat chow. Group B was administered 25000mg/kg body weight of yogurt; group C received 5000mg/kg body weight of the product, while group D received 10,000mg/kg body weight of samin yogurt. The yogurt administration to the different rat groups was done by oral intubation twice daily (9am and 6pm). At the end of the four week experimental period, the rats were anaesthetized in chloroform vapour and the brains were excised and preserved for histological analysis. **Results:** Histological analysis of the cerebral cortex of the brain showed that there was no noticeable effect of samin yogurt on the cyto-architectural disposition of the cerebral cortex of the rats treated with varying doses of the product.

KEYWORDS: Cerebral cortex, brain, samin yogurt, wister rats.

INTRODUCTION

Yogurt is said to be the most widely used fermented milk in the western world, where it is described as the bacterial curdling of milk, produced with the use of specific bacteria (Robins, 1980).

Yogurt is a fermented dairy product obtained through anaerobic fermentation of lactose in milks by relevant microorganisms, most of which are classified as probiotic (Tull, 1996). The nutritional composition of yogurt include proteins, Vitamins (such as B2 and B12), minerals (such as Calcium, Zinc, Potassium, Magnesium) and fat. The conversion of lactose into lactic acid gives yogurt its characteristic gel-like texture (Braing, 2005; Elson and Hass 2005). In its production, lactose in evaporated whole milk, skimmed milk or fresh cow's milk is converted into lactic acid by a symbiotic bacterial culture of streptococcus thermophilus and lactobacillus bulgaricus growing at temperatures in the range of 40-45^oC (Wood, 1985). According to Sanful (2009), many Ghanaians consume yogurt as a snack or as a pro-biotic food drink to acid digestion and to re-establish a balance

within the intestinal microflora. It is preferred over milk as it contains lactic acid that is readily digested as compared to lactose contained in unfermented milk, and more importantly, being a natural drink with flesh, acidulated taste and addictive flavour, it has propylactic and therapeutic properties (Roissart and Luquet, 1994). In their work, Flynn and Cashman (1997) reported that about 30-45% of total phosphorus intake of Western countries is derivable from yogurt. Femandes et al (1987) advocated use of yogurt in the prevention and treatment of gastrointestinal disorders, management of lactose intolerance and hypercholesterolaemia and even prevention of neoplastic diseases (Femandes and Shahani, 1990; Colombel et al, 1987). Since yogurt is now produced in most countries of the world (Nigeria inclusive), with its quality being determined by the type of milk used in the manufacturing process, additives present in the product and manufacturing practices and conditions (Banczar et al, 2002), a study of its effect on the microarchitecture of the cerebral cortex of the brain is deemed necessary. The 2-3mm thick cerebral cortex constitutes the outer covering of the gray matter over the hemispheres. The cortex has areas that directly receive

sensory inputs, such as hearing, vision, somatic sensations and production of limb movements, even as other areas are important in more complex cortical functions like memory, creativity, judgment, language, emotion, abstraction and attention (Swenson, 2006): the essentiality of the activities and functions of the cerebral cortex in maintaining the overall well being of the body can therefore not be overemphasized. This study was therefore designed to investigate the effect of yogurt on the brain cerebral cortex.

MATERIALS AND METHODS

Experimental Animals: Twenty four female wister rats weighing between 180-220 grammes, and of 8-9 weeks old were used for the study. The animals which were bred in the animal house of the Anatomy and Neurobiology Department of Imo State University Owerri, Nigeria were divided into four groups and placed in separate cages labeled A, B, C and D respectively. The rats which were six in their respective cages were fed ad libitum with rat feed and water. The group A rats that served as the control group received only water and normal rat feed, while the test animals (Group B, C, and D) were administered varying doses of the yogurt sample twice daily (9am and 6pm) for twenty eight days.

RESULTS

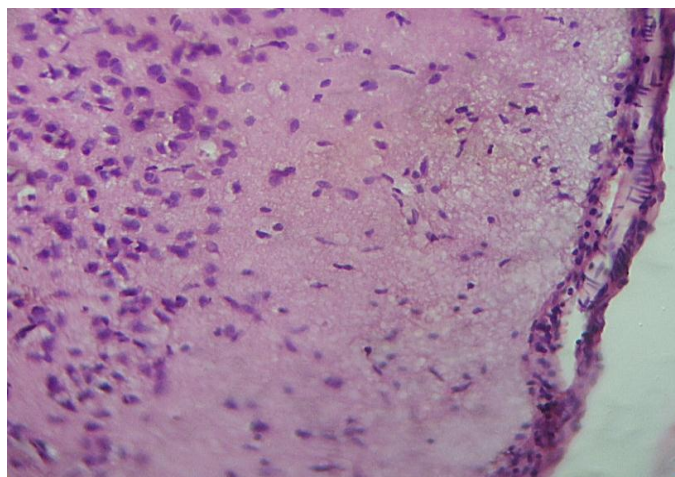


Plate I: Photomicrograph of brain tissue from group A (control) showing normal cerebral cortex ($\times 400$ H & E stain).

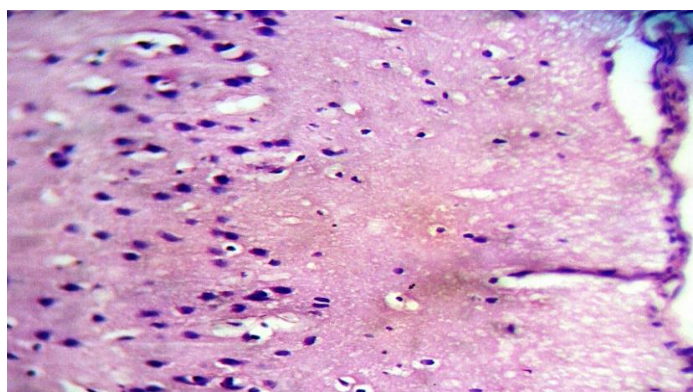


Plate II: Photomicrograph from group B showing normal cytoarchitectural disposition of the cerebral cortex.

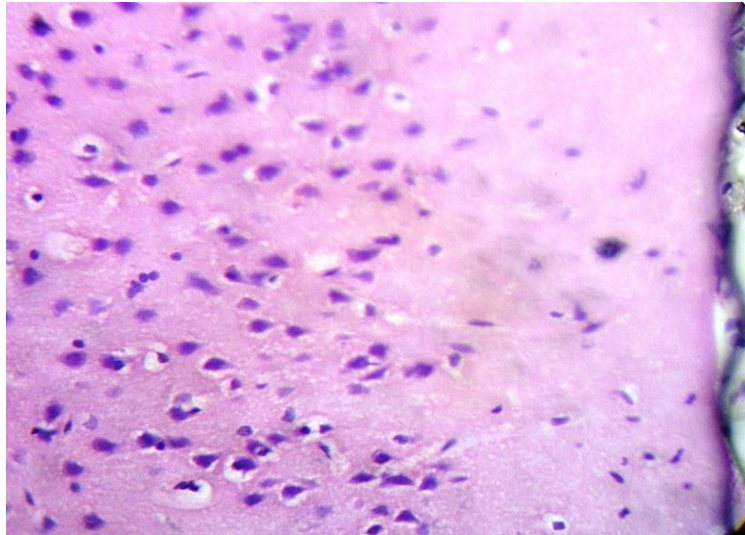


Plate III: Photomicrograph from group C showing normal cytoarchitectural disposition of the cerebral cortex.

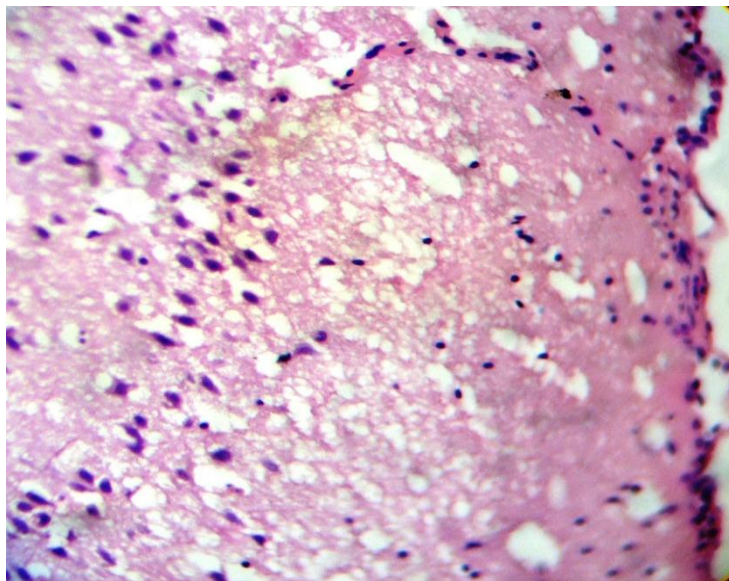


Plate IV: Photomicrograph from group D showing a seemingly normal cytoarchitectural disposition of the cerebral cortex.

DISCUSSION

On probing the appropriately stained thin sections of the cerebral cortex of the group A rats under the microscope, and as shown on plate I, the several distinct layers could be deciphered and the nerve cell bodies were unmistakably noticed. A result very similar to that of group A was obtained when the photomicrograph of the group B rats was studied. All the histologic features characteristic of a normal cerebral cortex were intact. Surprisingly, the cytoarchitectural disposition of the cerebral cortex of the group C and D rats as shown on their respective photomicrographs were all normal and quite similar to that of the control group. No form of histological or structural anomaly was noticed in any of the groups treated with the varying doses of the samini yogurt. It could therefore be deduced that samini yogurt may be good for the overall well being of the cerebral cortex of the brain.

CONCLUSION

Consumption of samini yogurt, even at large quantities may not be harmful to the cerebral cortex of the brain. Instead it may serve well for the overall well-being of the cerebral cortex, especially in adult wistar rats.

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