



Activities of raw and partially boiled quail (*Coturnix Coturnix Japonica*) eggs in increasing Megakaryocyte count among Aplasia-Induced mice

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Abstract

Megakaryocytes are among the largest cells in the body formed via multiple-staged megakaryopoiesis. These precursor cells release hemostasis-essential platelets into the circulation after undergoing thrombopoiesis. The significance of megakaryocytes and platelets is immediately apparent since a wide range of patients face morbidity and mortality from bleeding due to moderate to severe thrombocytopenia. In the tropics such as the Philippines, the mosquito borne viral disease dengue has become potentially deadly due to complications of plasma leaking, severe bleeding, and organ impairment. The bleeding mechanism for dengue remains poorly understood but the World Health Organization (WHO) specified thrombocytopenia with normal platelet function as a criterion. It has become potentially deadly due to its complications of plasma leakage, severe bleeding, and organ impairment. Quail eggs are packed with nutrients such as the B vitamins (B12, B9, and B3) which are vital for megakaryopoiesis. This study alleviates the negative effects of thrombocytopenia, the emerging cases of hemolytic disorders and dengue cases through the use of quail eggs. It has an impact on decreasing the need for blood transfusions in severe cases of dengue and hematopoietic disorders. It provides a less expensive and more accessible management for people who have problems in blood cell production and formation, especially megakaryocytes. Previous studies reported the hematopoietic effect of raw quail eggs however; the effect of food processing to its megakaryopoietic activity is unknown. The study employed a quantitative method featuring manipulation or intervention, randomization, and experimental control. It utilized a viable negative control, a group of mice induced with aplasia but not administered with quail eggs, from where the baseline megakaryocyte count was obtained. Forty-five female mice were divided into nine groups consisting of five mice each; the untreated, control and experimental groups. The experimental groups were further subdivided into three groups depending on dosage frequency of raw and partially boiled quail eggs. The mice, excluding the untreated group, were treated with Hydroxyurea prior to quail egg administration. By the end of the three weeks, all mice were euthanized using anesthetics, and their spleens were harvested by the veterinarian. It was then brought to a pathologist who examined the harvested organs and performed megakaryocyte cell counts. The spleen was harvested and evaluated since it is the primary murine extramedullary hematopoietic organ especially in pathologic conditions like lethal irradiation. The number of megakaryocytes in 100 sequential High Power Objective (HPO, 40x) fields was determined by a trained pathologist. The data of the count were obtained for comparative analyses between the control and experimental groups. Necessary computations were accomplished and appropriate interpretations of the results were drawn. The results of the experiment were gathered and statistically analyzed to address specific problems of the study. A comparison of the mean megakaryocyte counts between the control groups and the experimental groups was done to determine the effectiveness of quail eggs in increasing megakaryocyte levels among drug-induced mice with a 0.05 probability error (95%). The one-way Analysis of Variance (ANOVA) test was employed as a statistical tool to evaluate variance of data between and within more than two groups. Also, the Kruskal-Wallis H test was used for the comparison of the independent groups. It is a comprehensive test which solely points out that at least two groups were different. This study has shown that both raw and partially boiled quail eggs can increase the megakaryocyte counts of aplasia-induced mice. Results showed that all mice treated with raw and partially boiled quail eggs were significantly affected by the preparations administered. However, it was found out that raw and partially boiled quail eggs have similar effects and activities in increasing megakaryocyte counts. Furthermore, the study also revealed that increased consumption of raw and partially boiled quail eggs leads to higher megakaryocyte counts. Quail eggs then, either raw or food processed, can be effective management tools for thrombocytopenia by increasing megakaryocyte counts with increasing dosage and consumption. The researchers recommend the evaluation of progenitor cells other than megakaryocytes to specifically determine what cell is being stimulated by quail eggs. Other means of quail eggs preparation (i.e. hard boiled) and automated platelet count is suggested to be included in the final assessment of data for parallelism to the megakaryocyte count. Researchers also recommend the use of other hematopoietic organs for the assessment of megakaryopoiesis. Future researchers may compare the hematopoietic effect of quail eggs to other eggs and also use other laboratory test animals and larger organisms such as rabbits. Lastly, for the application of the study, quail eggs can be administered to dengue patients using the same preparations and do perform platelet count evaluation.

Biography

Herva A. Ordoño completed his first degree in Bachelor in Medical Laboratory Science last July 2017. He is also a Board Topnotcher in the March 2018 Licensure Examination for Medical Technologist and was awarded by the Republic of the Philippines. One of his research together with his colleagues was also published in 65th Annual Convention of the Philippine Association for the Advancement of Science and Technology and 8th Asian Heads of Research Councils Joint Symposium held in 2016. He is currently taking the Doctor of Medicine at Saint Louis University, Baguio City and is also planning to take up a residency program in the Department of Pathology for the next years to come.



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