Foam-Cell Signified Blood Vessel Endhotel Repair and Histopathology of Abdominal Aorta through Stem Cell Allogeneous Therapy to Rats (Rattus norvegicus) with Atherosclerosis

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ABSTRACT
Atherosclerosis is a chronic inflammation process of endothel cell layer of blood vessels which is initiated by the dysfunction of the endothel. This research aimed at understanding the repairment mechanism of the function of endothel in cardiac blood vessels with atherosclerosis case after being given medium-intensity physical exercises, mesenchymal stem cell and combination of the medium-intensity physical exercises and mesenchymal stem cell by looking into the foam cell of abdominal aorta. This research employed true experimental research design with post test only control group design. The sample of this research were 24 male Wistar rats (Rattus norvegicus) furrow that were controlled its homogeneity using inclusive criteria; confirming atherosclerosis, 20 week age, weight ranged from 180-200 gram, inhybrid, and healthy that were indicated by good desire for food and behaved normally. The Rattus norvegicus which fulfilled the inclusive criteria were divided into three groups which first group was the control group (atherosclerosis rats). The second group was atherosclerosis rats and received regular medium-intensity physical exercises. The third group atherosclerosis which received combination of regular medium-intensity physical exercises and received mesenchymal stem cell. The result of manova test showed value p < 0.001 which indicated the existence of different foam cell found in the control group, exercise group, stem cell group and combined exercise and stem cell group. It can be concluded that attempt to decrease the risk factor of atherosclerosis is one of the ways to protect the endothel of the blood vessels. Deep understanding on this mechanism is expected to give new insights to do preventive action and treatments toward atherosclerosis by combination therapy of regular medium-intensity physical exercises and received mesenchymal stem cell.

Keywords: atherosclerosis, physical exercise, stem cell, foam cell.

INTRODUCTION
Coronary heart disease is a disease with high mortality level which case keeps increasing especially in the developing countries. The coronary heart disease is also the main cause of the death in the world either for men or women (Rilantoro, 2014). In America, there was 550,000 people died of this disease every year. In Europe, it was estimated that around 20,000 to 40,000 people out of 1 million population died because of coronary heart disease. In 1999, heart disease placed in the third rank of the leading causes of death after diarrhea and stroke (Salim and Nurrohmah, 2013). The main cause that triggers coronary heart disease is atherosclerosis which is a multifactor process (Setiawan et al., 2011).
Atherosclerosis is a chronic inflammation process to the endothel cell layer of blood vessels which is initiated by the dysfunction of endothel cell (Rohman, 2007). Endothel dysfunction is a broad terminology that refers to any decrease on the production or supply of nitric oxide (NO) and/or imbalance among the relaxation and contraction factors that come from the endothel (Santoso et al., 2009).
A research done in United States of America showed that atherosclerosis was the main factor that caused troubles to blood circulation system that was experienced by 10% of the population of western countries whose age were around 65 year old. This frequency increased to 20% to older people above 75 year old. The incidence number of atherosclerosis reached up to 1.7 case per 10,000 population in a year. A research conducted in Italy showed incidence number of 4% to people around 34 to 44 year pd and 18% to people above 65 year old (Husin 2006).
The early process of atherosclerosis includes the infiltration of LDL-cholesterol to the tunica sub-intaime and the obstruction of LDL-cholesterol inside the tunica sub-intima. The obstruction of this LDL-cholesterol is caused by the interaction between apo-B which has positive