

## Pengaruh diet tinggi lemak pada pengembangan model hewan hiperlipidemia terhadap kadar PCSK9 plasma = The influence of high-fat diet on the development of animal model in hyperlipidemia to plasma levels of PCSK9

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### Abstrak

Diet tinggi lemak dan gaya hidup dipercaya menjadi faktor risiko yang secara fundamental berpengaruh terhadap kesehatan, terutama sebagai penyebab hiperlipidemia yang mengarah pada gangguan kardiovaskular. Proprotein convertase subtilisin/kexin type 9 (PCSK9) adalah protein yang mengatur degradasi reseptor low-density lipoprotein kolesterol (LDL) sebagai penentu kadar LDL plasma, meningkatkan aktivasi platelet dan inflamasi vaskular. Penelitian eksperimental melalui pemberian variasi diet tinggi lemak HFD I, HFD II, dan HFD III dievaluasi pengaruhnya terhadap profil lipid dan kadar PCSK9 plasma perlu dilakukan dalam upaya pengembangan model hewan hiperlipidemia. Profil lipid diukur menggunakan spektrofotometer UV-Vis dan kadar PCSK9 melalui ELISA dari 20 sampel plasma darah tikus Wistar jantan. Hasil evaluasi menunjukkan bahwa variasi diet tinggi lemak selama 10 minggu meningkatkan kadar kolesterol total dan trigliserida secara signifikan ( $p < 0,001$ ) dibandingkan dengan kelompok normal, perbandingan antarkelompok induksi berbeda signifikan ( $p < 0,001$ ), dan berhasil mencapai kondisi hiperlipidemia. Terdapat korelasi positif yang kuat dan signifikan antara kadar kolesterol total ( $r = 0,883$ ;  $p = < 0,001$ ) dan trigliserida ( $r = 0,817$ ;  $p = < 0,001$ ) terhadap kadar PCSK9 plasma. Kadar PCSK9 plasma pada kelompok induksi diet tinggi lemak berbeda signifikan ( $p = 0,029$ ) dibandingkan dengan kelompok normal. Pada penelitian ini, semua variasi diet tinggi lemak mampu meningkatkan kadar kolesterol total, trigliserida, dan kadar PCSK9 plasma dengan peningkatan terbesar terdapat pada komposisi HFD III yang mengandung 15% mentega dan 50% lemak kambing dengan komposisi asam lemak jenuh dan lemak trans yang relatif lebih tinggi. Penelitian lebih lanjut diperlukan untuk menganalisis pengaruhnya terhadap kerusakan jaringan vaskular pada model hewan hiperlipidemia.

.....High-fat diet and lifestyle are acknowledged to be risk factors that fundamentally affect health, especially as a cause of hyperlipidemia that leads to cardiovascular diseases. Proprotein convertase subtilisin/kexin type 9 (PCSK9) is a protein that regulates the degradation of low-density lipoprotein cholesterol (LDL) receptors as a determinant of plasma LDL levels, increases platelet activation and vascular inflammation. Experimental research through the provision of high-fat diet variations HFD I, HFD II, and HFD III evaluated its effect on lipid profiles and plasma PCSK9 levels requirements to be carried out to develop animal models of hyperlipidemia. Lipid profiles were measured using a spectrophotometer UV-Vis and PCSK9 levels by ELISA from 20 blood plasma samples of male Wistar rats. The results of the evaluation showed that the variation of a high-fat diet for 10 weeks increased total cholesterol and triglyceride levels significantly ( $p < 0,001$ ) compared to the normal group, the comparison between the induction groups was significantly different ( $p < 0,001$ ), and managed to achieve hyperlipidemia. There was a strong and significant positive correlation between total cholesterol levels ( $r = 0,883$ ;  $p = < 0,001$ ) and triglycerides ( $r = 0,817$ ;  $p = < 0,001$ ) on plasma PCSK9 levels. Plasma PCSK9 levels in the high-fat diet induction group were significantly different ( $p = 0,029$ ) compared to the normal group. In this study, all

variations of a high-fat diet were able to increase total cholesterol, triglycerides, and plasma PCSK9 levels with the considerable increase in the composition of HFD III which contained 15% butter and 50% goat fat with relatively higher saturated and trans fatty acid compositions. Further research is required to analyze its effect on vascular tissue damage in animal models of hyperlipidemia.