ABSTRAK

GAMBARAN HISTOLOGIS LAMBUNG PARS FUNDUS TIKUS MODEL DIABETES MELITUS TIPE 2 YANG DITERAPI NANOPARTIKEL EKSTRAK ETANOL DAUN SIRIH MERAH (*Piper crocatum)*

Farah Alya Yumna

19/442187/KH/10111

Diabetes melitus tipe 2 (DMT-2) adalah penyakit metabolik yang ditandai hiperglikemia karena resistensi insulin dan berakibat terjadinya gangguan pada sistem pencernaan seperti kembung, mual, dan muntah. Menarik untuk diteliti pengobatan DMT-2 dengan menggunakan herbal, salah satunya adalah nanopartikel ekstrak etanol daun sirih merah (NpEEDSM) yang mengandung senyawa hipoglikemik. Penelitian ini bertujuan mengetahui gambaran histologis lambung pars *fundus* model DMT-2 dengan terapi NpEEDSM. Sampel berupa 30 ekor tikus yang dibagi lima kelompok. Kelompok kontrol negatif DMT-2 (NDM); kelompok kontrol positif DMT-2 (DM) diinduksi Streptozotocin-Nicotinamide (STZ-NA); P30, P60, dan P90 kelompok yang diinduksi STZ-NA dan diterapi NpEEDSM dosis berturut-turut 30, 60, dan 90 mg/kg BB sekali sehari 28 hari peroral. Tikus dinyatakan diabetes apabila kadar glukosa darah ≥ 150 mg/dL. Pada hari ke-29, dilakukan euthanasia, organ difiksasi dalam bufer formalin 10% dengan cara perfusi. Lambung dibuat preparat histologis dalam sayatan parafin dan pewarnaan Hematoksilin-Eosin. Gambaran histologis lambung pars *fundus* diamati menggunakan mikroskop cahaya dan didokumentasikan menggunakan perangkat Optilab. Hasil penelitian menunjukkan perubahan struktur histologis lambung pars *fundus* berupa hipertrofi dan susunan sel parietal yang tidak teratur pada kelompok DM, P30, P60, sedangkan NDM tidak ada perubahan, dan P90 mengalami perbaikan. Ketebalan tunika mukosa pada DM berbeda signifikan dengan NDM dan P90 ($P<0.01$), namun NDM tidak berbeda dengan P90 ($P>0.01$). Persentase hipertrofi sel parietal DM berbeda signifikan dengan NDM, P30, P60, dan P90 ($P<0.01$), namun NDM tidak berbeda dengan P90 ($P>0.01$). Tunika submukosa, tunika muskularis, dan tunika serosa tidak teramati adanya perubahan. Kesimpulan penelitian ini, DMT-2 menyebabkan penurunan ketebalan tunika mukosa, hipertrofi sel parietal, dan susunan sel parietal tidak teratur. Terapi NpEEDSM 90 mg/kg BB meningkatkan ketebalan tunika mukosa, penurunan persentase hipertrofi sel parietal, dan perbaikan susunan sel parietal sama dengan kondisi NDM.

Kata kunci : nanopartikel, sel parietal, lambung pars *fundus*, daun sirih merah, DMT-2

ABSTRACT

HISTOLOGYC FEATURES OF PARS FUNDICA STOMACH OF DMT-2 RAT MODEL THAT TREATED BY NANOPARTICLE ETHANOLIC EXTRACT RED BETEL LEAF (NpEERbL)

Farah Alya Yumna

19/442187/KH/10111

Type 2 diabetes mellitus (T2DM) is a metabolic disease characterized by hyperglycemia due to insulin resistance and affected the digestive system particulary the diabetic gastroparesis manifestation such as bloat, nausea, and vomiting. Need to study the potential of herbal to treat T2DM, one of them is nanoparticles ethanolic extract red betel leaf (NpEERbL) that contain hypoglycemic compounds. This study aims to determine the histological features of pars fundus stomach of T2DM rat model with NpEERbL therapy. The sample was 30 rats that divided into five groups, 6 animal each group. The groups were non T2DM as negative control group (NDM); T2DM positive control group (DM) induced by Streptozotocin-Nicotinamide (STZ-NA); P30, P60, and P90 groups induced STZ-NA and treated by NpEERbL doses of 30, 60, and 90 mg/kg BW respectively once a day for 28 days. Rats were declared diabetic when blood glucose levels ≥ 150 mg/dL. On the 29th day, the rats were euthanized and fixed using 10 % bufferd formalin by perfusion method. The stomach was collected and processed for histological preparations on paraffin embedding and hematoxylin-eosin staining. The histological features of pars fundica of stomach were observed using light microscope and analyzed. The results showed changes in histological structure of the pars fundica stomach such as hypertrophy and irregular arrangement of parietal cell in the DM, P30, and P60 groups, while NDM had no change and P90 improved. The thickness of the mucosal tunica in DM differs significantly from NDM and P90 ($P<0.01$), whereas the NDM is no different from P90 ($P>0.01$). The percentage of parietal cell hypertrophy in DM differs significantly from NDM, P30, P60, and P90 ($P<0.01$), NDM is no different from P90 ($P>0.01$). Submucosal tunica, muscular tunica, and serous tunica no changes. In conclusion of this study, T2DM causes a decrease in the thickness of the mucosal tunica, hypertrophy and irregular arrangement of parietal cell. Treatment of 90 mg/kg BW NpEERbL improved pars fundica stomach condition by an increase in the thickness of the tunica mucosa, decrease in the percentage of parietal cell hypertrophy, parietal cell arrangement resembling NDM.

Keywords : nanoparticle, parietal cell, pars fundica stomach, red betel leaf, T2DM