

INTISARI

GAMBARAN HISTOLOGIS KOLON TIKUS MODEL DIABETES MELLITUS TIPE-2 DENGAN TERAPI NANOPARTIKEL EKSTRAK ETANOL DAUN SIRIH MERAH (*Piper crocatum*)

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Diabetes mellitus tipe 2 (DMT-2) adalah penyakit metabolisme yang ditandai kondisi hiperglikemia akibat resistensi reseptor insulin dan dapat menyebabkan gangguan sistem digesti. Diperlukan pengobatan alternatif DMT-2 seperti penggunaan herbal, salah satunya adalah nanopartikel daun sirih merah yang mengandung bahan aktif dengan efek antidiabetik. Penelitian ini dilakukan untuk mengetahui perubahan histologis akibat induksi DMT-2 pada kolon yang diterapi nanopartikel ekstrak etanol daun sirih merah (NpEEDSM).

Penelitian ini menggunakan 29 ekor tikus jantan galur Wistar, dibagi menjadi lima kelompok. 5 ekor kelompok kontrol non DMT-2 (KN); 6 ekor kelompok positif DMT-2 (KD) induksi STZ-NA; dan masing-masing 6 ekor kelompok (P1), (P2), dan (P3) kelompok induksi STZ-NA disertai perlakuan terapi nanopartikel ekstrak daun sirih merah (NpEEDSM) dosis berturut-turut 30 mg/kg BB, 60 mg/kg BB, dan 90 mg/kg BB sehari sekali per oral selama 28 hari. Hewan dinyatakan diabetes saat glukosa darah ≥ 150 mg/dl. Kolon dikoleksi dan dibuat preparat histologi menggunakan pewarnaan hematoksilin eosin.

Hasil penelitian menunjukkan perubahan histopatologis berupa hiperplasia sel epitelium pada kelompok KD dan P1, hiperplasia kelenjar Lieberkuhn pada KD, P1, P2, dan P3. Ketebalan tunika mukosa kelompok KD dan P1 berbeda signifikan dengan KN ($P < 0,05$), sedangkan P2 dan P3 tidak berbeda dengan KN ($P > 0,05$). Ruang subepitel (*Gruenhagen space*) terbentuk pada kelompok KD, P1, dan P2 dan tidak terbentuk pada P3. Ketebalan tunika muskularis KD dan P3 meningkat signifikan dibanding dengan KN ($P < 0,05$), sedangkan kelompok P1 dan P2 tidak berbeda dengan kelompok KN ($P > 0,05$). Kesimpulan penelitian ini, pemberian NpEEDSM dosis 60 mg/kg BB menunjukkan respon terbaik pada histologis kolon induksi DMT-2 dengan tidak adanya hiperplasia sel epitel, penebalan tunika mukosa, dan tunika muskularis sama seperti pada tikus non diabetes.

Kata kunci: Daun sirih merah, diabetes mellitus tipe 2, kolon, nanopartikel

ABSTRACT

HISTOLOGICAL FEATURES OF COLON OF RAT MODEL TYPE-2 DIABETES MELLITUS THAT TREATED BY NANOPARTICLE RED BETEL LEAF ETHANOLIC EXTRACT (*Piper crocatum*)

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Type-2 diabetes mellitus (T2DM) is a metabolic disease that characterized by hyperglycemia due to insulin receptor resistance and causes digestive system disorders. Need to study an alternative treatment for T2DM such as the use of herbs, one of this is nanoparticles of red betel leaf that potentially have hypoglycemic effect. This study aims to determine histological changes of colon due to T2DM that treated by red betel leaf ethanol extract nanoparticles (NpEERBL).

The study used 29 male of the Wistar rat, divided into five groups, 6 animal each group except 5 animal for group non-T2DM. The groups were non-T2DM (KN); STZ-NA-induced T2DM (KD) positive groups; and groups (P1), (P2), and (P3) T2DM that treated with NpEERBL doses of 30, 60, and 90 mg/kgBW respectively, orally, once a day for 28 days. Determination of T2DM animals based on the examination of blood glucose ≥ 150 mg/dl. On the 29th day the rats were euthanasized and fixated using 10% buffer formalin by perfusion method. The colon was collected for histological preparations using hematoxylin-eosin staining and observed by light microscope.

The results showed that there were an epithelial cell hyperplasia in groups KD and P1, hyperplasia of the Lieberkuhn gland in groups KD, P1, P2, and P3. The thickness of the mucosal tunica KD and P1 groups were significantly increase compared with KN group ($P < 0.05$), while P2 and P3 groups were not significantly different compared with KN group ($P > 0.05$). The subepithelial spaces (Gruenhagen spaces) were formed in KD, P1, and P2 groups but not found in P3 group. The thickness of muscular tunica KD and P3 groups were significantly increase compared with KN group ($P < 0.05$), while P1 and P2 groups were not increase compared with KN group ($P > 0.05$). The conclusion of this study, the administration of NpEERBL at a dose of 60 mg/kg BW showed best response on colon histological that there were no epithelial cell hyperplasia, no thickening of the mucosal tunica and muscular tunica like non-diabetic rat.

Keywords: Red betel leaf, type 2 diabetes mellitus, colon, nanoparticle