

Fig. 1 A large intestine endoscope image and a blood vessel extraction result

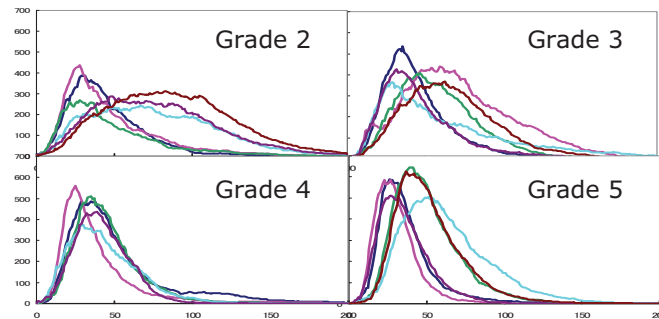


Fig. 2 Extracted blood vessel numbers curves for each histological classification of Matts grade from 2 to 5

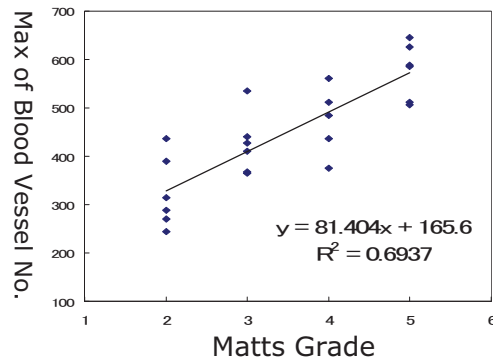


Fig. 3 The good correlation between the histological Matts grades and extracted maximum of blood vessel numbers

Content:

The ulcerative colitis is appointed in an intractable disease in Japan to repeat a recurrence by the inflammatory disease that a sore and the ulcer are formed on the mucous membrane (the inside) of the large intestine. The endoscope is used for the diagnosis. The purpose of this study is to support diagnosing it by computer image processing for the blood vessel pictures of the large intestine inside. By the blood vessel image extraction and characteristic parameter research, the degree of inflammation from the state of a mucous membrane would be intended to estimate by the image processing instead of the histological classification.

At first, blood vessels are extracted from an endoscope image, as shown in Fig. 1, and the blood vessel characteristic parameter is researched, that is effective to estimate an inflammatory diagnosis degrees. The matching filter of the Gaussian distribution type is used to extract blood vessels. By changing the threshold value for the binarization, blood vessel number is computed through labeling process for each threshold value. The curve profiles of the blood vessel number are shown in Fig.2 for the histological Matts grades of 2 of slight illness to 5 of most serious case. Figure 2 includes 23 cases so that 23 curves are shown in total. Shapes of curve profile for each the histological grade level are clearly different, that is, the lower grade shows the flatter curve profile. To examine our image processing performance, the correlation between the Matts grade of 2 to 5 and maximum of blood vessel numbers are shown in Fig. 3. As the results, the correlation coefficient is as good as $R = 0.833$.

Keywords : Large intestine endoscope image, blood vessel extraction, Matts grade evaluation by computer-aided image processing

E-mail: konaka@ee.tokushima-u.ac.jp

Tel. +81-88-656-7469