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Localization and characterization of hematopoietic tissues in adult sea cucumber, *Apostichopus japonicus*

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Abstract: Sea cucumber *Apostichopus japonicus* rely on the efficient innate immune mechanisms against invaders, in which the consumption and regeneration of coelomocytes take place at the same time. In the present study, histological features of putative hematopoietic tissues (HPTs) including the rete mirabile, the respiratory tree, the polian vesicle and the coelomic epithelium were characterized. The distribution of transcription factor GATA1 in coelomocytes and putative HPTs was examined by immunohistochemistry. In addition, cell proliferation using EdU labeling and coelomocyte distribution in different tissues using monoclonal antibody labeling were analyzed to further confirm the HPTs. The results showed that two homologs of GATA1 were detected with molecular weight of 43 and 90 kDa in coelomocytes, rete mirabile, respiratory tree and polian vesicle, whereas no signals were detected in the coelomic epithelium. A few cells were detected to be EdU-positive for coelomocytes, which accounted for approximately 9.5%. In the rete mirabile and the respiratory tree, the EdU signals were strong in cells of the tube wall. In the polian vesicle, numerous EdU-positive cells were detected in the cyst wall. In the coelomic epithelium, little EdU signaling was detected. Immunohistochemistry analysis by mAb 3F6 against *A. japonicus* coelomocytes showed that positive signals were observed in the tube wall of the rete mirabile, respiratory tree, cyst wall of the polian vesicle and in the coelomocyte antrum of coelomic epithelium. These results suggest that the rete