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Short Communication

Establishment and characterization of a cell line from a feline histiocytic sarcoma

Ryo Miyamoto[a], Sena Kurita[a], Hiroyuki Tani[a], Masato Kobayashi[a], Soudai Sugiura[a], Kae Shigihara[b], Yuka Sato[c], Yoshikazu Tanaka[c], Kyoichi Tamura[a], Makoto Bonkobara[a,*]

[a] Department of Veterinary Clinical Pathology, Nippon Veterinary and Life Science University, 1-7-1 Kyonan-cho, Musashino-shi, Tokyo, 180-8602, Japan
[b] Veterinary Medical Teaching Hospital, Nippon Veterinary and Life Science University, 1-7-1 Kyonan-cho, Musashino-shi, Tokyo, 180-8602, Japan
[c] Department of Veterinary Hygiene, Veterinary School, Nippon Veterinary and Life Science University, 1-7-1 Kyounan, Musashino, Tokyo, 180-8602, Japan

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ABSTRACT

Feline histiocytic sarcoma (HS) is an aggressive and uncommon tumor originating from dendritic cells/macrophages. Here, a feline HS cell line, FHS-1, was established from a case of feline HS and characterized. Immunohistochemically, FHS-1 cells were positive for vimentin and Iba-1, and negative for MHC class II and CD163. FHS-1 cells were positive for α-naphthyl butyrate esterase staining, which was clearly inhibited by sodium fluoride. FHS-1 cells had phagocytic and antigen uptake/processing activities. Moreover, FHS-1 cells were tested for susceptibility to feline infectious peritonitis virus (FIPV) strain 79-1146; however, this cell line was not susceptible to this viral strain. Although FHS-1 cells lost the expression of MHC class II and CD163, our findings indicate that FHS-1 is a feline HS cell line that retains functional properties of dendritic cells/macrophages in terms of phagocytic and antigen uptake/processing activities. While FHS-1 cells are not suitable for *in vitro* study of FIP using strain 79-1146, they may be applicable for studies aimed at developing new diagnostic and therapeutic strategies for feline HS.

1. Introduction

Feline histiocytic sarcoma (HS) is an aggressive and fatal tumor originated from dendritic cells/macrophages (Friedrichs and Young, 2008; Wong et al., 2012; Moore, 2014). This tumor is uncommon in cats and previous studies have largely been restricted to case reports (Ide et al., 2009; Talavera et al., 2009; Ide et al., 2010; Teshima et al., 2012; Wong et al., 2012; Scurrell et al., 2013). Surgery alone may not achieve good control (Teshima et al., 2012; Scurrell et al., 2013) and the benefit of chemotherapy is not clear for feline HS. Recently, good responses to radiotherapy or a tyrosine kinase inhibitor, masitinib, have been reported in a small number of feline HS cases (Treggiari et al., 2017); however, an efficacious therapeutic approach to this tumor has yet to be established. One of the major reasons for the absence of a therapeutic strategy is the lack of knowledge of the biological features of feline HS cells due to the rarity of this tumor. Thus, the use of a feline HS cell line would be beneficial. However, to the best of the authors' knowledge, no feline HS cell line has been established. In the present study, we established and characterized a feline HS cell line from a case of feline HS.

2. Materials and methods

2.1. Case

The case was a 16-year-old castrated male domestic shorthaired cat with an esophageal mass. No evidence suggesting local lymph node and distant metastasis was noted by computed tomography scan. The tumor mass was surgically excised and subjected to histopathological, immunohistochemical, and cytochemical examinations for diagnosis. Based on these examinations, the cat was diagnosed with a HS (detailed in Results and discussion).

2.2. Establishment of the cell line

A piece of tissue was obtained from the surgically excised tumor mass and gently minced and cultured in Dulbecco's modified Eagle's medium (Thermo Fisher Scientific, Waltham, MA) supplemented with 10% fetal bovine serum (Thermo Fisher Scientific), 50 U/mL penicillin (Thermo Fisher Scientific), and 50 μg/mL streptomycin (Thermo Fisher Scientific) (cDMEM), according to a previously described procedure (Azakami et al., 2006). The cells that grew out from the minced tissues

* Corresponding author.
E-mail address: bonkobara@nvlu.ac.jp (M. Bonkobara).

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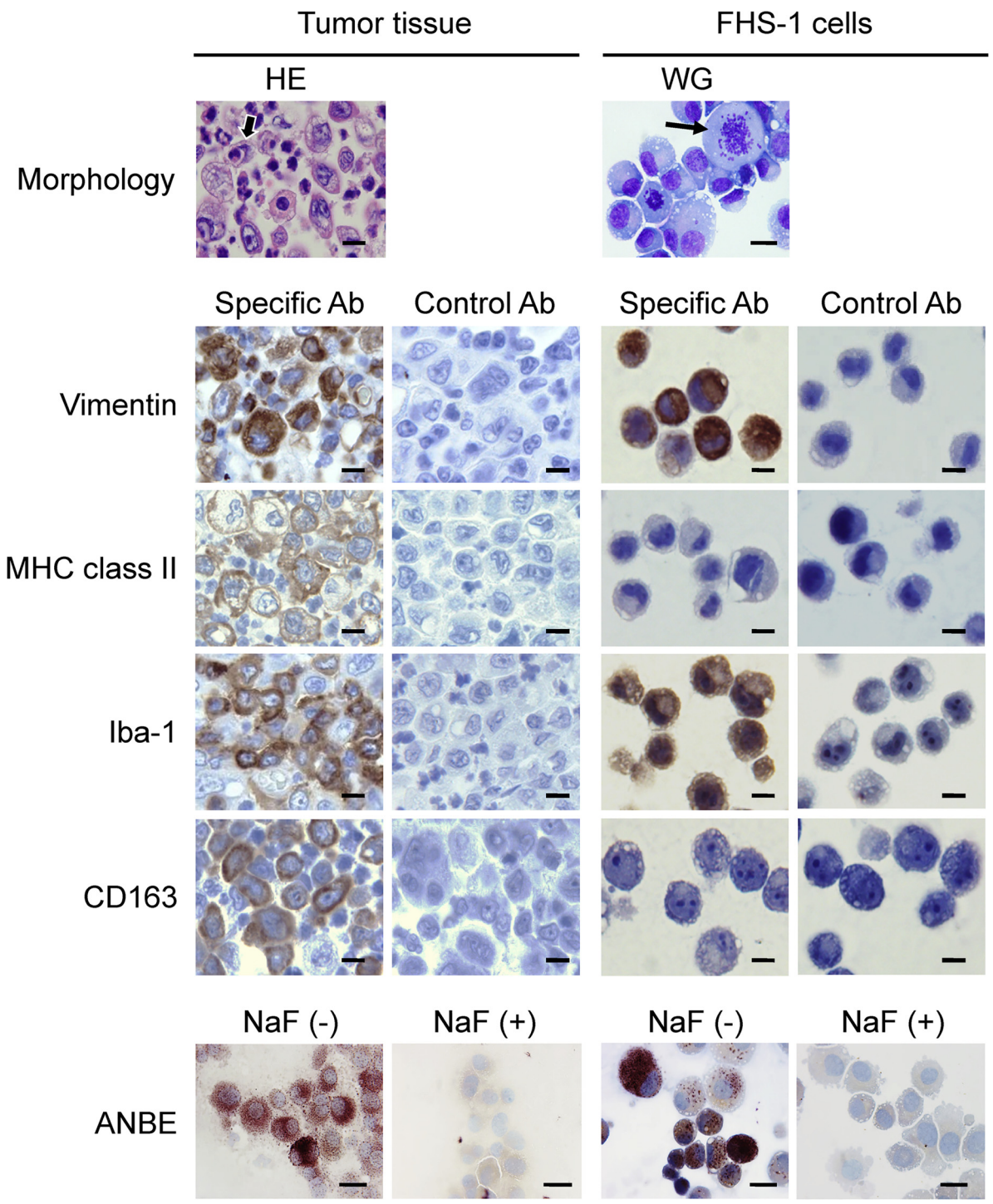

Fig. 1. Morphological, immunohistochemical and cytochemical examinations of the tumor tissue (left panel) and FHS-1 cells (right panel). HE indicates a tissue section stained with hematoxylin and eosin. The arrow indicates a neoplastic cell phagocytizing a neutrophil. WG indicates FHS-1 cells stained with Wright-Giemsa. The arrow indicates a mitotic figure. Immunohistochemically, the neoplastic cells in the tumor tissue were positive (brown staining) for vimentin, MHC class II, Iba-1, and CD163, but negative for control antibodies. In FHS-1 cells, the cells were positive (brown staining) for vimentin and Iba-1, but negative for MHC class II and CD163. No positive staining was detected for all control antibodies. Cytochemically, both neoplastic cells in tumor tissue and FHS-1 cells were positive for α-naphthyl butyrate esterase (ANBE) staining (red fine granular stain in the cytoplasm) in the absence of sodium fluoride, NaF (−), and both were negative in the presence sodium fluoride, NaF (+). Scale bars, 10 μm. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

were maintained in cDMEM. The HS cell line was established after more than 50 passages of these cells and named as FHS-1.

2.3. Morphological, immunohistochemical and cytochemical examinations of the tumor tissue and FHS-1 cells

The surgically excised tumor mass was fixed in 10% neutral buffered formalin and sections were prepared. The sections were stained