

A Novel Diagnostic Biomarker, PSMB9/ β 1i, For Human Uterine Leiomyosarcoma⁹

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COLUMN ARTICLE

Takuma Hayashi (Shinshu University) discussed a novel biomarker for detecting leiomyosarcoma (LMS). Patients with uterine LMS typically present with vaginal bleeding, pain and a pelvic mass, with atypical presentations of hypercalcemia and eosinophilia also being reported. There is concern that radiographic evaluation with combined positron emission tomography/computed tomography, which is commonly used to aid assessment of patient prognosis, might not necessarily be effective for diagnosis and surveillance of uterine LMS. Unfortunately, radiographic imaging cannot provide any medical information to help distinguish malignant LMS from other mesenchymal tumours. Importantly, diagnostic biomarkers that can distinguish between LMS and leiomyoma (LMA) are not yet established.

Hayashi's research group reports that PSMB9/ β 1i-deficient mice exhibit spontaneous development of uterine LMS, with a disease prevalence of ~37% by 12 months of age [1]. The current focus of Hayashi's research is to probe the loss of PSMB9/ β 1i expression in human LMS, as well as the detectable expression of the protein in human LMA

[2,3]. Defective PSMB9/ β 1i expression is likely to be one of the risk factors for the development of human uterine neoplasms, as it is in the PSMB9/ β 1i-deficient mouse. Thus, PSMB9/ β 1i is useful as a novel diagnostic biomarker for human uterine LMS, and Hayashi's research group have been trying to establish novel diagnostics with PSMB9/ β 1i to the uterine LMS under the SIGMA-Aldrich Collaboration Laboratory.

The IHC experiments demonstrated that although normal myometrium tissues (73 cases) and uterine leiomyoma tissues (52 cases) markedly expressed PSMB9/ β 1i, uterine LMS tissues (58 cases) did not (Figure 1). Defective PSMB9/ β 1i expression is likely to be one of the risk factors for the development of human uterine neoplasm, as it is in the PSMB9/ β 1i-deficient mouse. Thus, PSMB9/ β 1i is useful for a novel diagnostic biomarker for human uterine LMS [2,3]. Because there is no effective therapy for unresectable uterine LMS, our results may bring us to specific molecular therapies to treat this disease [4].

	Age	n	PSMB9/ β 1i expression*			
			-	-/+1	Focal+2	+++3
Normal	32~83	73				73
Leiomyoma (Cellular leiomyoma) (Ordinary Leiomyoma) (Tumour of Uncertain malignant potential)	33~83	52 (10) (30) (12)				52
Bizarre Leiomyoma	44,49,55	3				3
Leiomyosarcoma	32~83	58	49	3	4	2

Staining score of PSMB9/ β 1i expression from results of staining experiments. -/+1: Partially positive (5% to 10% of cells stained), focal +2: focal positive (focal or sporadic staining with less than 5% of cells stained), +++3: diffuse-positive (homogenous distribution with more than 90% of cells stained), -: negative (no stained cells)

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