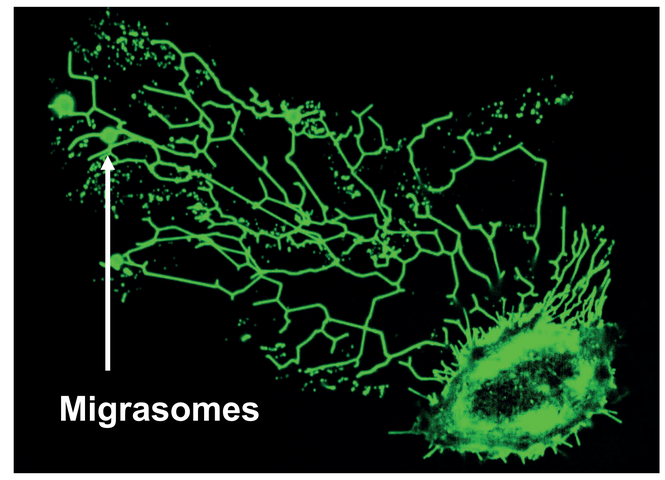
A peptide interface for collection and functional analysis of migrasomes

ᵒ Mina Okochi, Shogo Saito (Institute of Science Tokyo, Japan)

Abstract

https://doi.org/10.17952/38EPS.2026.P535

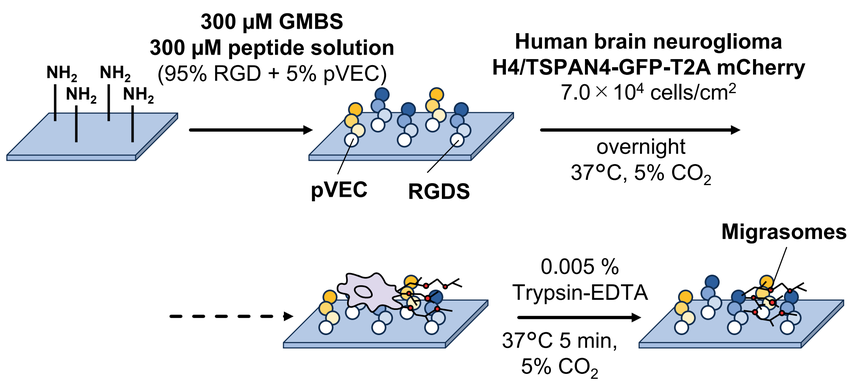
Migrasomes are a specific type of extracellular vesicle that form onto filamentous structures, called retraction fibers, left behind by migrating cells [1]. Recently, we developed a method to collect migrasomes using the peptide-modified substrates while detaching the cells [2]. Capturing migrasomes in an intact manner is crucial for evaluating their function, as they exhibit a multivesicular structure and contain mechanisms for the release of internal molecules. Moreover, because migrasome formation on retraction fiber is closely linked to cell migration, the number of migrasomes produced is generally lower than that of other secreted vesicles. Therefore, the use of peptide-modified substrates for selective fractionation allows for the functional assessment of small quantities of intact migrasomes generated by migrating cells and their effects on recipient cells. Consequently, this method holds promise for elucidating migrasome-mediated communication in cell-cell interactions, such as those involving the IL-6 amplifier.



[1] L. Ma *et al.*, *Cell Res.*, 25, 24-38 (2015), [2] S. Saito *et al.*, *Mater. Sci. Eng. C*, 131, 112495 (2021).

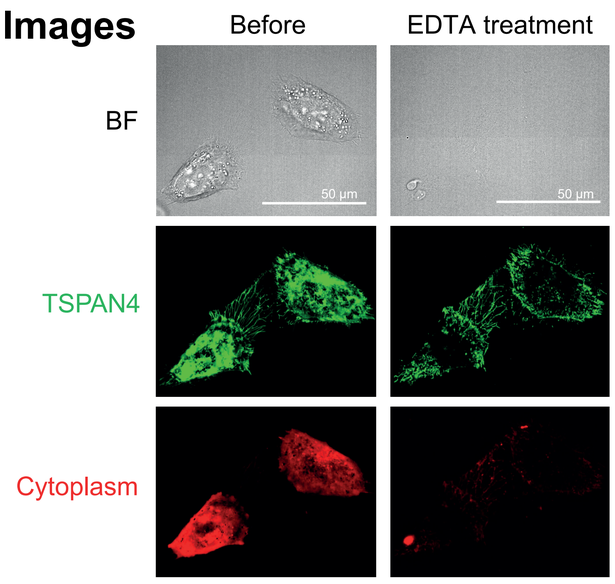
1 Capture of H4 cell-derived migrasomes using the peptide-modified substrate

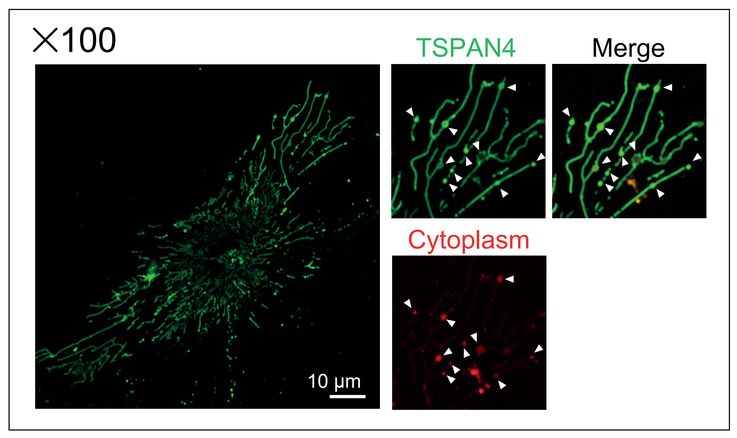
Peptide modification of NH_2-surface



RGD: Integrin ligand, GRGDSGGGC
pVEC: Cell-penetrating peptide, LLIILRRRIRKQAHAHSKGGGC

Images

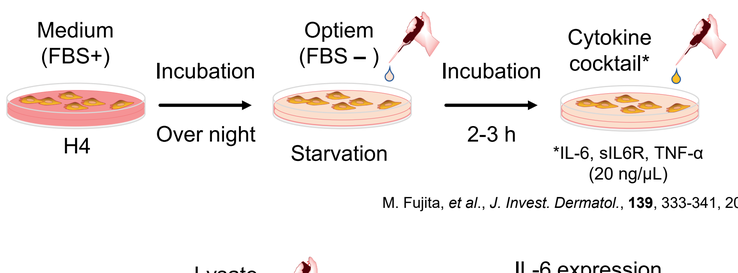




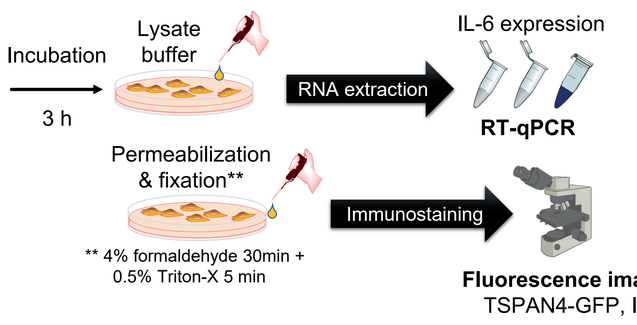
Cytoplasmic component observed inside of migrasomes
→ **Migrasomes were captured on the peptide-immobilized substrate without damages.**

2 Induction of IL-6 amplifier

Cell treatment



M. Fujita, *et al.*, *J. Invest. Dermatol.*, **139**, 333-341, 2019



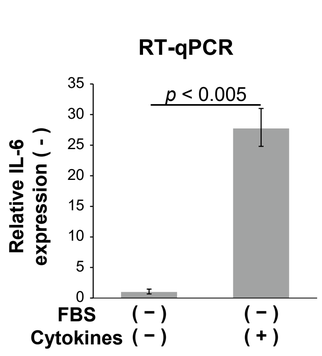


Fig. Evaluation of IL-6 expression level by RT-qPCR.

IL-6 expression increased by 25-fold.

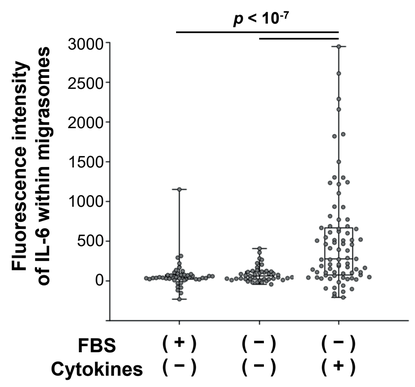
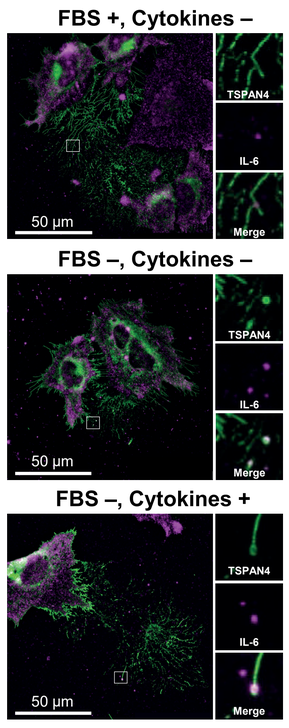


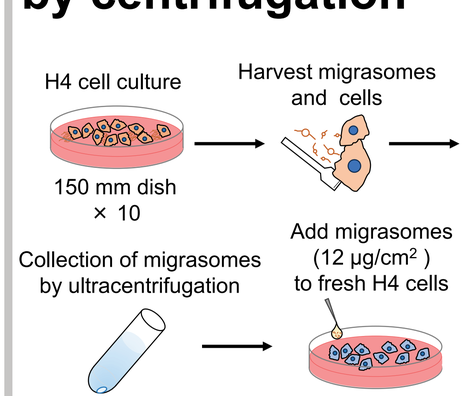
Fig. Evaluation of fluorescence intensity in the migrasome region by immunostaining.

The amount of IL-6 expression increased in migrasomes.

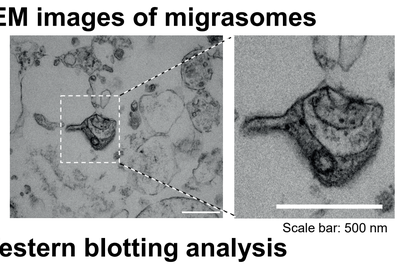
IL-6 were concentrated in migrasomes compared to the cell body upon IL-6 amplification.



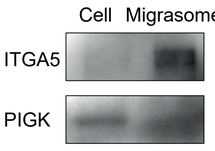
3 IL-6 amplifier induction using migrasome collected by centrifugation



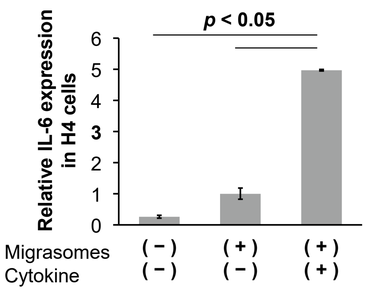
TEM images of migrasomes



Western blotting analysis

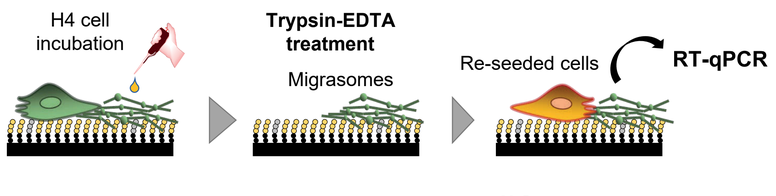


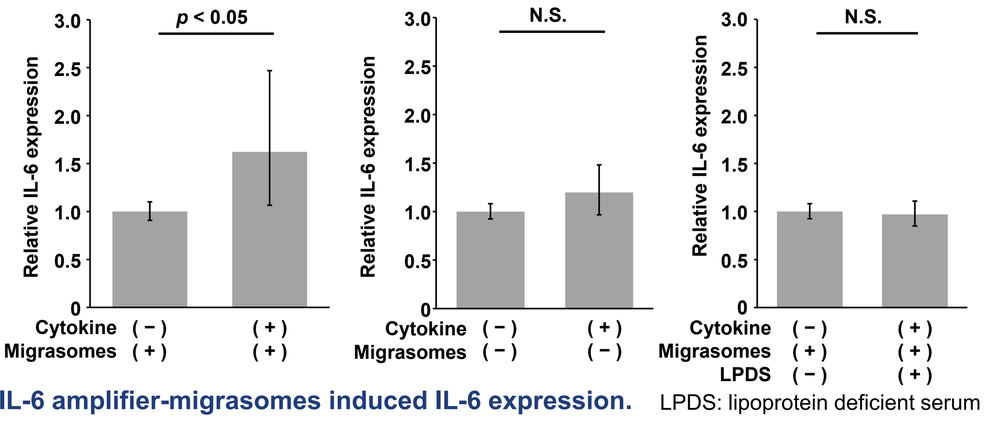
Migrasome marker proteins
ITGA5: Integrin α5
PIGK: Phosphatidylinositol glycan anchor biosynthesis class K



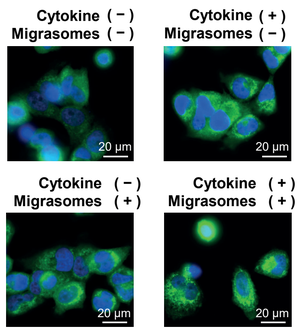
Addition of migrasomes increased IL-6 expression by 5-fold.

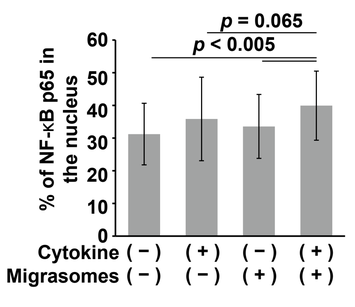
4 IL-6 amplifier-induced cell derived migrasomes promote IL-6 expression in the recipient cells



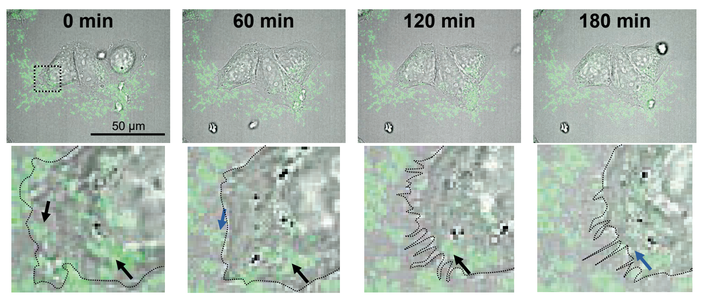


IL-6 amplifier-migrasomes induced IL-6 expression. LPDS: lipoprotein deficient serum





IL-6 amplifier-migrasomes induced NF-κB activation.



Cellular uptake of migrasomes (green, black arrow) **captured on the surface.** The photos below are a time course of an enlarged view of the area within the dashed-line square.

Conclusions

Migrasomes derived from IL-6 amplifier-induced human neuroglioma were shown to promote inflammatory responses in the recipient cells. When migrasomes from the IL-6-amplifier-induced cells captured on a peptide-modified substrate were used to stimulate cells, even a small number of migrasomes was sufficient to induce IL-6 expression [3,4]. These findings suggest that migrasomes contribute to inflammatory signaling via cell-to-cell communication, highlighting their potential roles in cytokine transduction and offering insights into therapeutic strategies targeting intercellular communication in inflammatory diseases.

[3] S. Saito et al. Inflammation-induced cell-secreted migrasome promotes IL-6 expression in the recipient cells. *Biomater. Adv.*, 184, 214793 (2026) . [4] A. B. R. D. Putra et al. *J. Biosci. Bioneg.* (in press)