Application Note

Subcutaneous transplantation of cancer patient derived cells into mice using MatriMix

Overview

Patient-Derived Xenograft (PDX) models, in which cancer patient-derived cells are transplanted into mice, are attracting attention in the fields of cancer pathology analysis and therapeutic drug development. In this experiment, we investigated the feasibility of using MatriMix (511) as a substrate for transplantation into mice. Spheroids made from cells derived from colorectal cancer patient cells were mixed with MatriMix (511) and implanted subcutaneously in mice, followed by tumorigenesis and histological analysis.

Methods

1. Mix the MatriMix (511) A/B/C solutions according to the instructions.
2. On ice, dilute the MatriMix (511) solution 1.5 times with the medium for spheroid culture.
3. Collect spheroids produced by three-dimensional culture according to the usual method.
4. Suspend spheroids containing 0.5 x 10^5 cells per mouse in 100 µL of MatriMix (511) solution.
5. Fill a FN syringe (27G) with a MatriMix (511) solution in which the spheroids are suspended and implanted subcutaneously in a mouse.
6. Observe tumor formation over time.
7. Fix the collected tumor for histological analysis.

Results

When cancer patient-derived spheroids were transplanted into mice, tumors (red arrows) formed using MatriMix was shown to be similar in size to those using EHS tumor extracts (511) (Fig. 1).

Masson's trichrome staining of sections from tumors formed using MatriMix (511) revealed many cells with vascular invasion and with atypical nuclei (Fig. 2). In addition, immunofluorescent staining using various markers revealed that the colon cancer cells and vascular endothelial cells were localized within the tumor (Fig. 3).

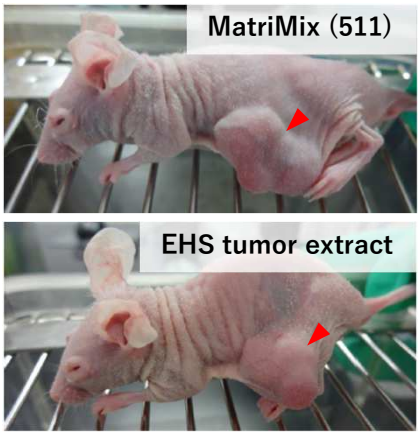

Fig. 1 Mouse subcutaneous implantation experiment
Mice 4 weeks after transplantation with patient-derived spheroids (Top: MatriMix (511), Bottom: EHS tumor extract)

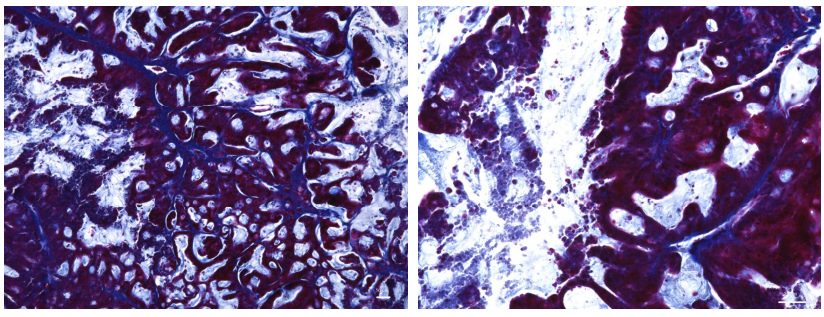

Fig. 2 Masson's trichrome staining of tumor sections
Tumors formed by implantation of patient-derived spheroids in MatriMix (511) were collected, and sections were stained with Masson trichrome.
(Left: low magnification, right: high magnification)

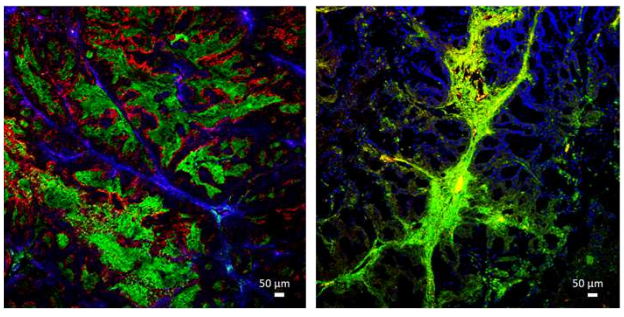

Fig. 3 Immunofluorescent staining of tumor sections
Tumors formed by implantation of patient-derived spheroids in MatriMix (511) were collected, and sections were stained with various markers.
(Left: Type IV Collagen, Type I Collagen, CEA)
(Right: DAPI, αSMA, PECAM-1)

Conclusion

MatriMix (511) was found to be useful for facilitating tumorigenesis by transplantation of cancer patient-derived spheroids in mice. In the future, we would like to evaluate MatriMix in the Patient-Derived Spheroid Xenograft (PDSX) model.

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