がん細胞およびがん細胞特異的粒子分泌物のSERSを用いる選択的高感度検出に関する調査研究

Detection of hypersialyated metastatic cancers by surface enhanced Raman scattering

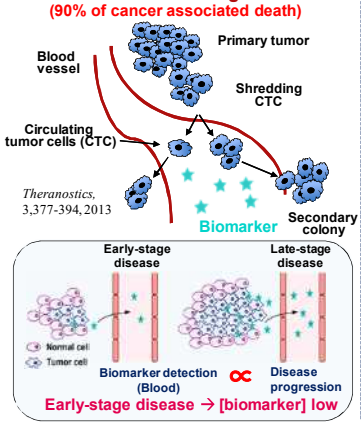
概 要

[1] Application of phenyl-boronic acid-installed PEGylated (APBA-PEG-*b*-PAMA) gold nanoparticles (GNP) coupled with Toluidine blue O (T/BA-GNPs) as surface enhanced Raman scattering (SERS) probes to target surface hypersialyated (N-acetylneuraminic acid, Neu5Ac) metastatic cancer cells and tumors tissue explants.

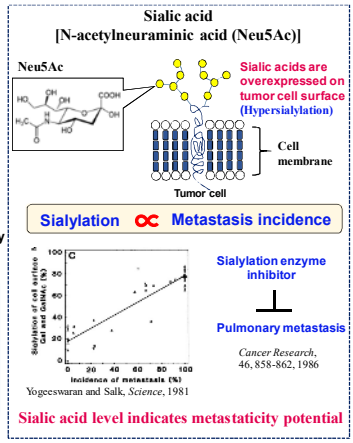
[2] Reactive oxygen species (ROS)-mediated abrogation of sialylation pathway in cancer cell lines by nitroxide-radical containing nanoparticle (RNP)

INTRODUCTION

Metastasis

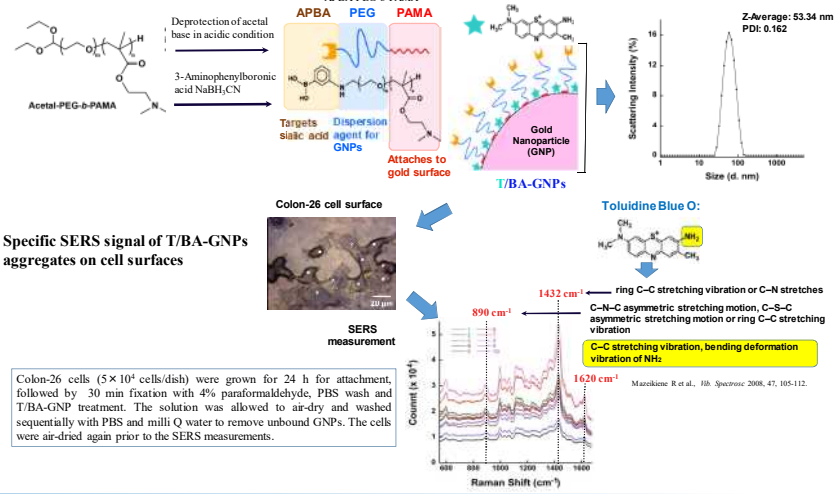


Metastasis and Hypersialylation



This study

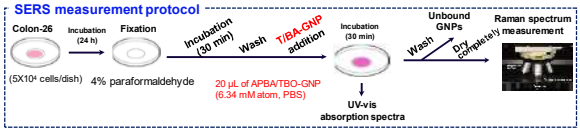
Synthesis of SERS probe APBA-PEG-*b*-PAMA targeting sialic acid

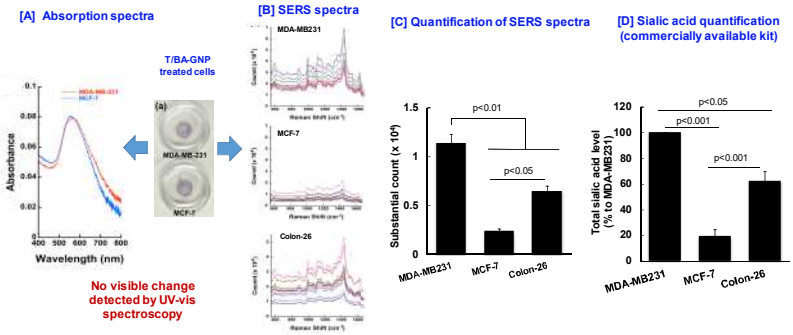


Colon-26 cells (5×10^4 cells/dish) were grown for 24 h for attachment, followed by 30 min fixation with 4% paraformaldehyde, PBS wash and T/BA-GNP treatment. The solution was allowed to air-dry and washed sequentially with PBS and milli Q water to remove unbound GNPs. The cells were air-dried again prior to the SERS measurements.

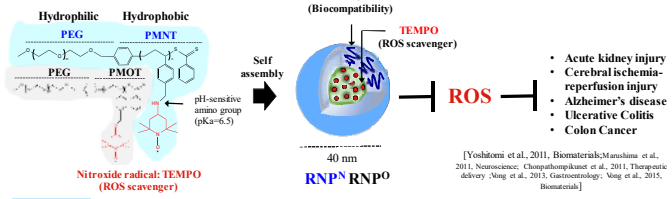
RESULTS

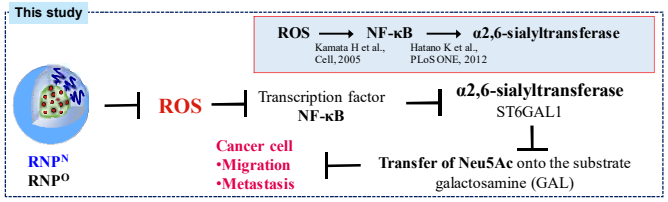
[1] SERS intensity correlates with metastatic potential in breast cancer cell lines



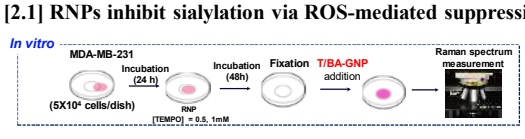


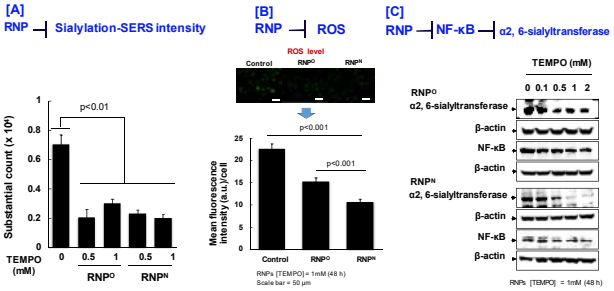
[2] ROS scavenging nitroxide-radical containing nanoparticles (RNPs) as anti-metastatic candidate

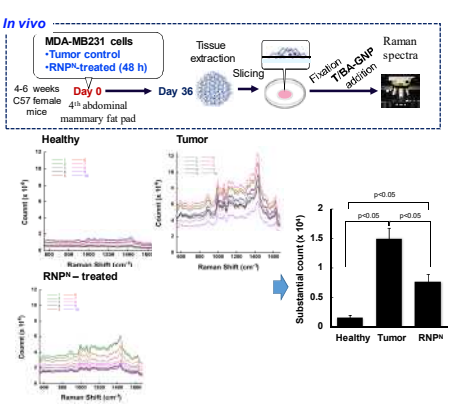




[2.1] RNPs inhibit sialylation via ROS-mediated suppression of sialyltransferase



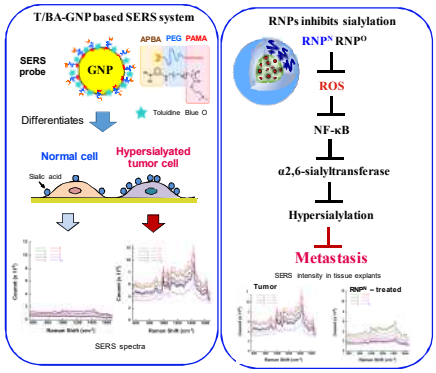




CONCLUSION

T/BA-GNP-SERS
Potential cytodiagnostic system

ROS-scavenging RNPs
Potential anti-metastatic agent



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