

The Investigation of Fibrosis in Desorption Paraffin-embedded Aorta Vessel of Aortic Dissection with Synchrotron-based Polarized-FTIR Microspectroscopy

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Abstract

The localized aortic fibrosis is the result of vessel inflammation after endovascular repair, which is distributed within the aortic vessel wall induces heterogeneous mechanical stress for the hypertension patients^[1-2]. The fibrosis region can be investigated by using synchrotron-based polarized-FTIR microspectroscopy based on the characteristic absorption of the amide II band and collagen in the spectral range of 1600-1480 cm⁻¹ and 1340-1240 cm⁻¹. A higher population of collagen was observed in the local inflammatory tissue of the aorta and a lower population was found in the normal aorta vessel as expected^[3]. On the other hand, paraffin was found less population in the fibrosis region than that of the normal region after the desorption of paraffin-embedded aortic vessel; Furthermore, paraffin residue declined more rapidly in areas of vascular fibrosis than in normal areas. Elongation of oligosaccharide residues (glycans) of the antibody has happened in the inflammatory region in the aortic vessel, however, the chain length of glycans was expected to be shorter than those of the inflammation region^[4-5]. Based on these findings, we proposed paraffin containing hydrocarbons with carbon numbers from 24 to 26 should bind to the regular oligosaccharide residue of glycoconjugates anchoring in the cell membrane. Accordingly, the fibrosis within the aorta of aortic dissection can be resolved by using polarized SR-FTIR and paraffin distribution.

Keywords - aortic fibrosis, vessel inflammation, oligosaccharide residues, FTIR microspectroscopy

References

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