Histologic and enzymatic background for biosynthesis of aberrant glycosylated prostate-specific antigen

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Conflict of Interest Disclosure

I have no potential conflict of interest to report

Background & Objective:

Although we previously reported that the prostate cancer diagnostic performance of serum aberrant glycosylated PSA (S2,3PSA test and LDN-PSA) test much superior to conventional PSA test ^{ref1,2}, **histopathologic and enzymatic background for biosynthesis of aberrant-glycosylated PSA in prostate tissue has still unknown.** Ref 1. Ishikawa et al., *IJMS*, 2017; Ref 2 Yoneyama et al., *Cancer Sci.* 2019



In this study, we investigate the origin of aberrant-glycosylated PSA in prostate tissues.

Material & Methods:

Mapping of benign and tumor tissue of 71 prostate section

21 20 22 23 25 28 33 24. 26 29 32 FFPE prostate section in 71 patients who underwent radical prostatectomy 40 41 42 51 52 60 62 68 69 58 59 61 65 66 67 63 64 Benign Tumor PC associated glycosyltransferase gene expression in tissue Macro-dissection Make drop of Benign & tumor tissue $-\alpha 2,3$ Sialylation α2.6 Sialvlation ST3GAL3,4,6 ST6GAL1 2 PCR DNA PC tissue Total LacdiNAclyation-Gleason **RNA** B4GALNT3,4 attern Bead analysis **Digital PCR** Aberrant glycosylated PSA Aberrant glycosylated PSA in tissue C fissue Gleaso Desktop instrument reagent cartridge Tissue extracts Benign type S2.6PSA Cancer type Cancer ty S2,3PSA LDN-PSA %S2,3PSA S2,3PSA test LDN-PSA test Buffers and labeled antibody solution for SPFS immunoassay

Glycosyltransferase gene expression in benign & tumor tissue

S2,3PSA ratio & LDN-PSA/tPSA in benign & tumor tissue



Sialylation related gene	Expression level in tissue	%S2,3PSA ratio in tissue
ST6GAL1	G 3 > Benign = G4 & 5	
ST3GAL3,4,6	No change	Benign = G 3 < G 4 & 5
Sialidase	No change	
LacdiNAclyation related gene	Expression level in tissue	LDN-PSA/tPSA level in tissue
B4GALNT3	Very low & No change	Denion = O O A O A P E
B4GALNT4	Benign = G 3 < G 4 & 5	Benign = G 3 < G 4 & 5

Conclusion:

Variation of Sialyltransferase and GalNAc transferase gene expression well correlated with tissue aberrant glycosylated PSA ratio.

Aberrant glycosylated PSA mainly secreted from PC cells, especially higher Gleason pattern.