

Novel diagnostic marker to differentiate urogenital carcinoma by chiral amino acids in body fluids

Principal Investigator

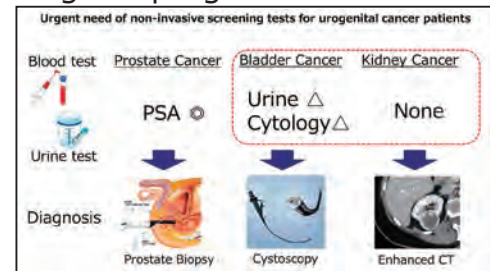
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Project Outline

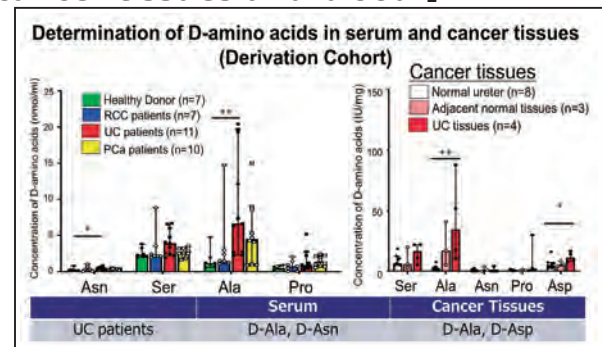
● Importance of differential diagnosis for patients with urogenital cancers including urothelial carcinoma

Early detection and early treatment are key to improving the prognosis of patients with urogenital cancers which have been on the rise in recent years due to the aging society. However, for urothelial carcinoma and renal cell carcinoma, there is no simple and highly diagnostic blood. We have been investigating whether D-amino acids, which are mirror images of L-amino acids and have been thought to have no bioactivity in vivo in humans, could be a novel diagnostic marker for urogenital carcinoma.



[D-amino acids are highly expressed in cancer tissues and blood.]

D-alanine and D-asparagine were highly expressed in the serum of urothelial carcinoma patients, while D-alanine and D-aspartic acid were highly expressed in cancer tissues, respectively. D-alanine and D-aspartic acid were shown to have positive effects on cancer cells by increasing their proliferative, invasive, and migratory capacities against cancer cell lines.



[D-Amino Acids as Potential Tumor Diagnostic Agents]

The results showed that the three independent cohorts of 357 samples had high diagnostic performance in common (left figure). In addition, after comparing the results with urine samples and examining the possibility of differential diagnosis with renal cell carcinoma, we have succeeded in developing a diagnostic agent using blood D-amino acids to differentiate urogenital cancer, and have applied for a patent for this development. (Patent Application No. 2023-036041).

Diagnostic ability of urothelial carcinoma patients using serum D-Asparagine			
	Derivation Cohort (n=35)	Validation Cohort 1 (n=254)	Validation Cohort 2 (n=69)
Urothelial carcinoma	n=11	n=92	n=21
Diagnostic Ability (AUC)	0.784	0.851	0.853
Sensitivity	90.9%	78.4%	89.5%
Specificity	66.7%	79.3%	68.0%
Youden's index	0.5758	0.5774	0.5747
Urine Cytology			
Sensitivity	-----	-----	50%
Specificity	-----	-----	100%

Target disease: Urothelial carcinoma, renal cell carcinoma

Patent information: Patent application 2023-036041

Characteristics of the technology: Novel blood-based urogenital carcinoma differential diagnostic agent

Marketability, challenges in development: Market development through multicenter collaborative research

Desired corporate collaboration: Licensing out