

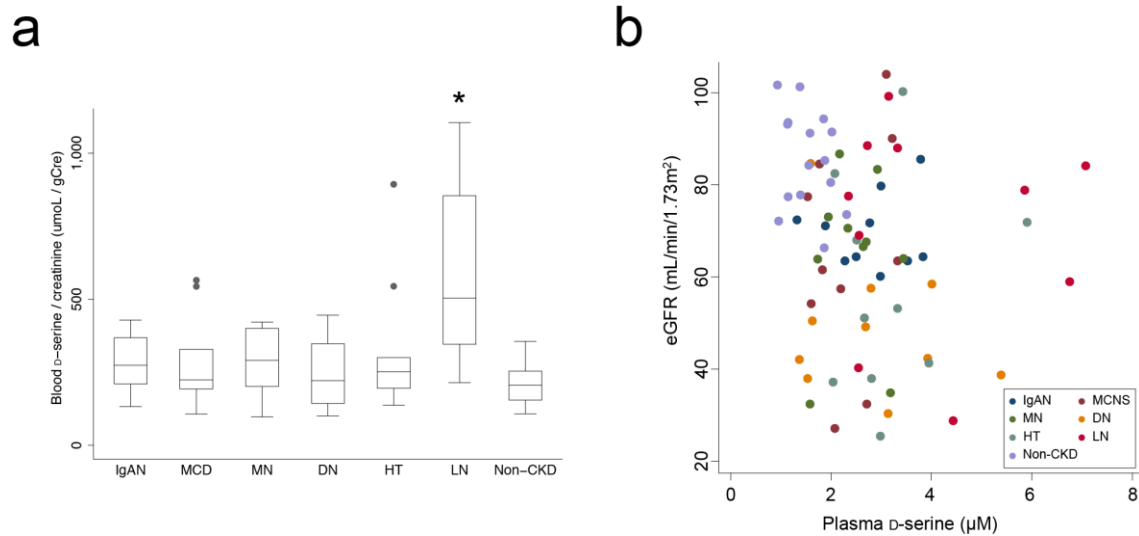
Supplementary information

Intra-body dynamics of D-Serine reflect the origin of kidney diseases.

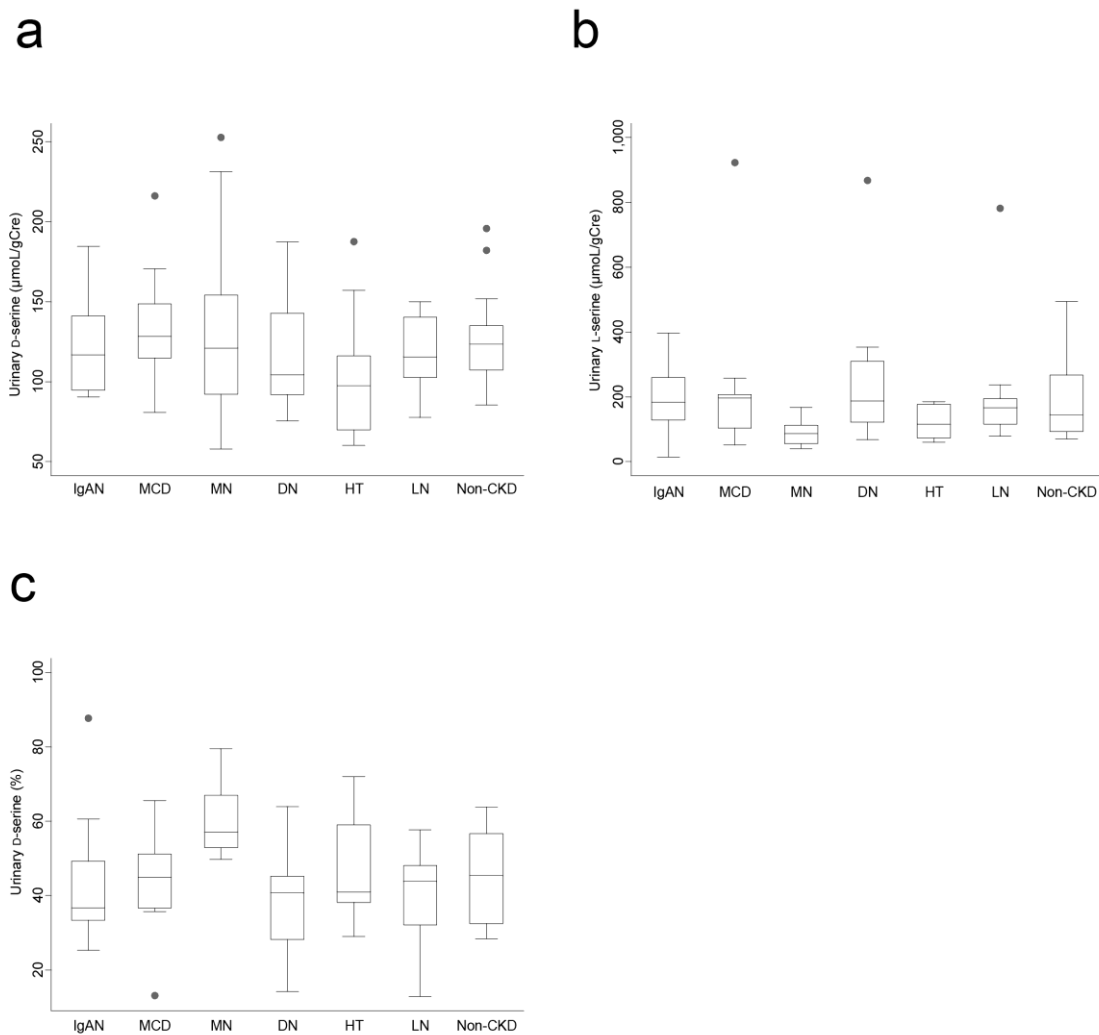
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5 Supplementary figures

1 Supplementary table



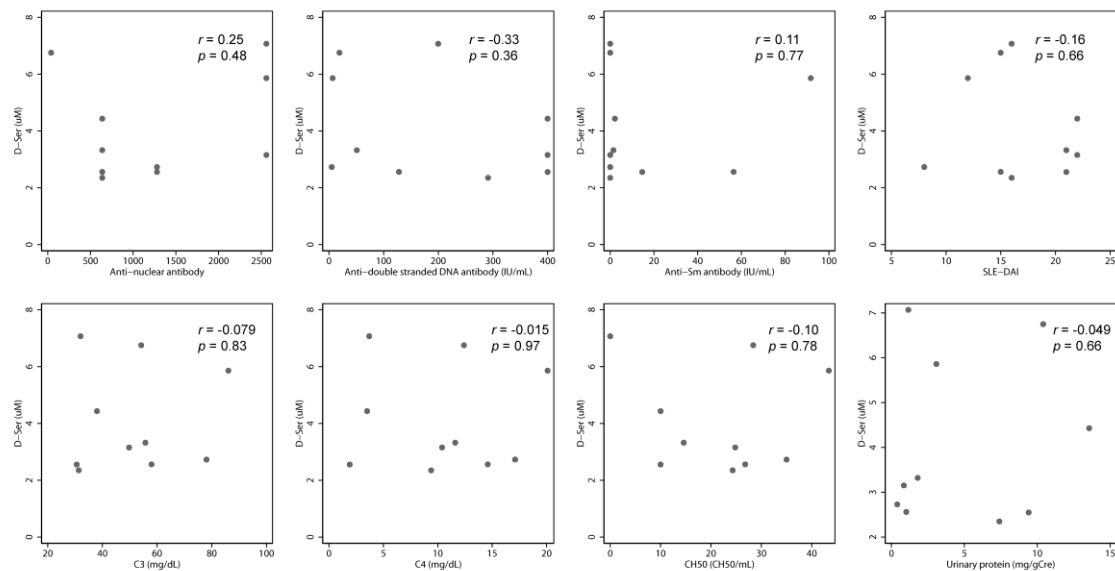
Supplementary Fig. 1 Relation of plasma level of D-serine, serum level of creatinine, and estimated glomerular filtration rate (eGFR). **a** Blood ratios of D-serine per creatinine in each kidney disease. **b** Relation between eGFR and plasma level of D-serine were plotted. Reference data of non-chronic kidney disease (CKD) are from [7]. IgAN, IgA nephritis; MCD, minimal change disease; MN, membranous nephropathy; DN, diabetic nephropathy; HT, hypertensive nephropathy; LN, lupus nephritis. $n = 10$ for each disease and 15 for non-CKD. $*P < 0.05$ versus non-CKD (one-way ANOVA).



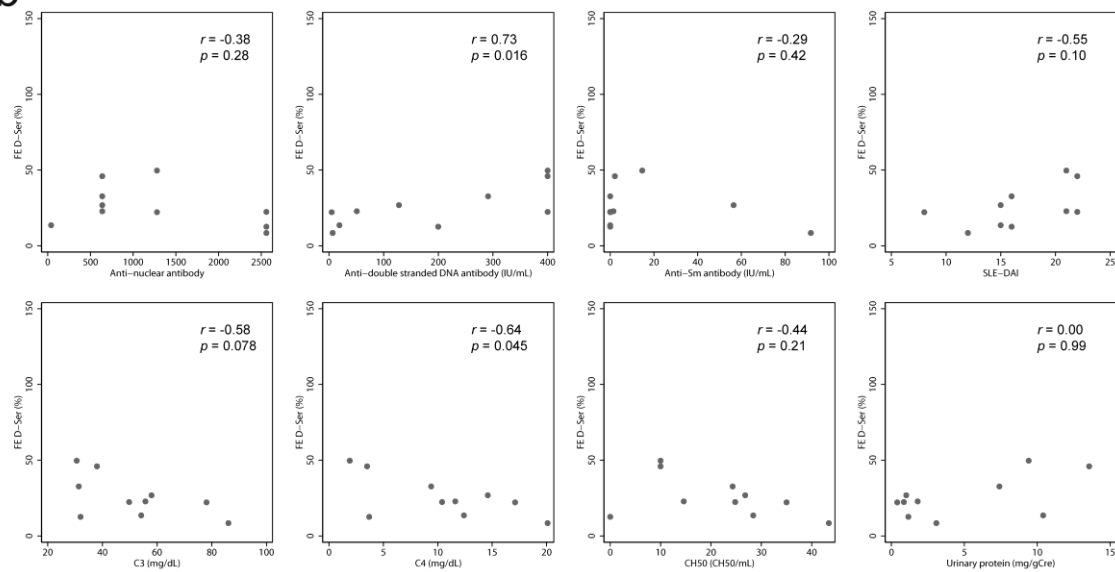
Supplementary Fig. 2 Urinary excretions of D-serine in various kidney diseases. **a-c** Urinary levels of **(a)** D-serine and **(b)** L-serine, or **(c)** urinary ratio of D-serine per total serine, in each kidney disease. Reference data of non-CKD are from [7]. IgAN, IgA nephritis; MCD, minimal change disease; MN, membranous nephropathy; DN, diabetic nephropathy; HT, hypertensive nephropathy; LN, lupus nephritis; CKD, chronic kidney disease. $n = 10$ for each disease and 15 for non-CKD.

Figure S3

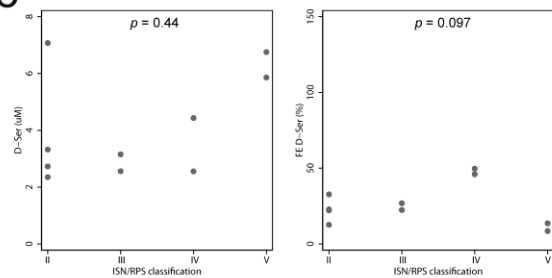
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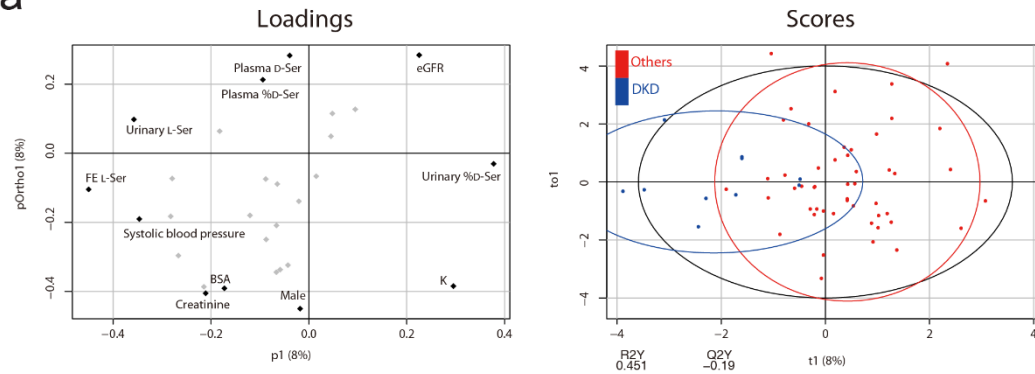
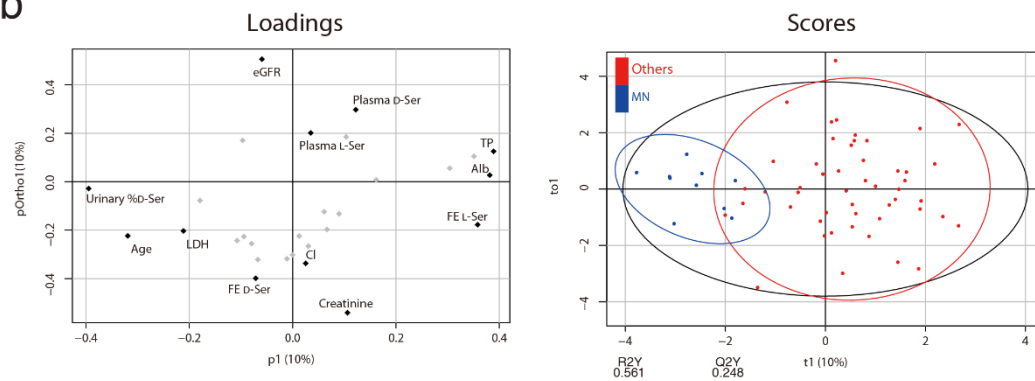
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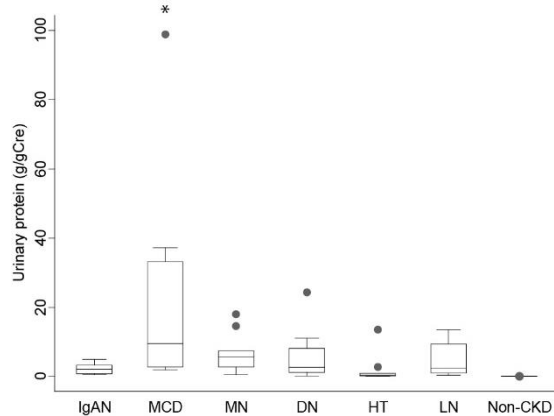
c



Supplementary Fig. 3 Relation of D-serine profile and activity of lupus nephritis. a, b Relation between **(a)** plasma level of D-serine profile, and **(b)** fractional excretion (FE) of D-serine, with clinical and laboratory data that are associated with SLE or reflect its activity. **c** Profile of D-serine in histological categories of LN based on the 2003 International Society of Nephrology / Renal Pathology Society classification. SLE-DAI, SLE Disease Activity Index.

a**b**

Supplementary Fig. 4 Relation of D-serine profile in the separation of kidney diseases. a, b Orthogonal projection to latent structure-discriminant analysis (OPLS-DA) plots in **(a)** DN and **(b)** MN patients compared with the rest of studied population. FE, fractional excretion; .eGFR, estimated glomerular filtration rate; BSA, body surface area; TP, total protein; Alb, albumin.



Supplementary Fig. 5 Urinary level of protein in various kidney diseases.

IgAN, IgA nephritis; MCD, minimal change disease; MN, membranous nephropathy; DN, diabetic nephropathy; HT, hypertensive nephropathy; LN, lupus nephritis; CKD, chronic kidney disease. Reference data of non-CKD are from [7]. $n = 10$ for each disease and 15 for non-CKD. * $P < 0.05$ versus non-CKD (one-way ANOVA).

Table S1. Baseline characteristics of each kidney disease.

	IgAN (n = 10)			MCD (n = 10)			MN (n = 10)			DN (n = 10)			HT (n = 10)			LN (n = 10)		
Age, yr	35	(30 - 41)		53	(43 - 66)		72	(63 - 79)		55	(45 - 66)		60	(55 - 63)		42	(39 - 52)	
Male gender, %		90 (9)			50 (5)			90 (9)			60 (6)			90 (9)			0 (0)	
Body mass index, kg/m ²	23.4	(21.2 - 25.8)		26.0	(23.9 - 27.0)		25.4	(24.1 - 26.6)		26.9	(26.5 - 28.0)		23.5	(22.8 - 27.2)		20.3	(18.7 - 22.6)	
Systolic blood pressure, mmHg	125	(113 - 132)		129	(123 - 137)		153	(137 - 155)		162	(149 - 165)		138	(129 - 158)		124	(107 - 138)	
Diastolic blood pressure, mmHg	73	(72 - 79)		81	(72 - 86)		87	(75 - 92)		87	(81 - 95)		90	(75 - 108)		80	(69 - 84)	
Serum protein, g/dL	7.1	(6.5 - 7.3)		4.9	(4.5 - 5.4)		5.0	(4.6 - 5.4)		5.9	(5.3 - 6.7)		7.2	(6.7 - 7.6)		6.4	(5.7 - 6.8)	
Serum albumin, g/dL	4.3	(4.1 - 4.4)		2.0	(1.6 - 2.1)		2.0	(1.9 - 2.5)		3.0	(2.4 - 3.6)		4.4	(4.1 - 4.5)		2.7	(2.4 - 2.8)	
Serum Creatinine, mg/dL	1.01	(0.98 - 1.04)		0.83	(0.67 - 1.00)		0.84	(0.75 - 0.87)		1.14	(1.10 - 1.19)		1.13	(0.87 - 1.44)		0.66	(0.62 - 0.78)	
eGFR _{creat} , mL/min/1.73m ²	67.8	(63.8 - 72.2)		62.6	(55.1 - 82.8)		67.2	(64.0 - 72.4)		45.8	(39.6 - 55.8)		52.2	(38.8 - 70.9)		78.2	(61.6 - 87.1)	
Serum UN, mg/dL	13.0	(12.0 - 14.0)		12.0	(10.3 - 17.0)		17.0	(14.0 - 19.5)		14.0	(12.5 - 14.8)		15.5	(14.3 - 18.8)		9.0	(7.3 - 14.5)	
Serum Na, mEq/L	141	(139 - 142)		139	(138 - 139)		140	(139 - 141)		141	(139 - 141)		140	(138 - 141)		136	(134 - 138)	
Serum K, mEq/L	4.1	(4.1 - 4.3)		4.3	(4.1 - 4.7)		4.4	(4.0 - 4.5)		3.9	(3.6 - 4.3)		4.1	(3.9 - 4.4)		4.1	(3.8 - 4.5)	
Serum Cl, mEq/L	106	(105 - 106)		105	(104 - 107)		106	(103 - 108)		107	(104 - 107)		106	(105 - 107)		102	(100 - 104)	
ALT, U/L	22	(19 - 26)		21	(15 - 35)		15	(12 - 22)		22	(16 - 27)		19	(14 - 39)		23	(15 - 30)	
LDH, U/L	198	(162 - 229)		230	(207 - 246)		251	(225 - 276)		226	(210 - 283)		171	(156 - 200)		246	(215 - 298)	
Urinary protein, g/gCre	2.11	(0.81 - 3.19)		9.50	(3.07 - 29.30)		5.70	(3.14 - 7.11)		2.69	(1.28 - 7.33)		0.34	(0.14 - 0.76)		2.44	(1.06 - 8.92)	
Urinary NAG, IU/gCre	16.1	(5.2 - 22.6)		17.9	(5.9 - 45.9)		10.8	(5.7 - 23.1)		22.6	(12.4 - 42.9)		9.6	(7.4 - 18.8)		21.9	(9.0 - 28.1)	
Urinary β2-MG, mg/gCre	0.43	(0.23 - 1.10)		0.18	(0.08 - 0.94)		0.12	(0.05 - 0.19)		0.66	(0.05 - 2.12)		0.59	(0.09 - 5.62)		0.37	(0.19 - 1.40)	
Hypertension history, %		0 (0)			50 (5)			80 (8)			90 (9)			100(10)			30 (3)	
Diabetes history, %		0 (0)			0 (0)			20 (2)			100 (10)			10(1)			0 (0)	
Hyperlipidemia history, %		0 (0)			20 (2)			60 (6)			60 (6)			10(1)			0 (0)	
Use of RASi, %		0 (0)			20 (2)			60 (6)			90 (9)			40 (4)			10 (1)	
use of other antihypertensive drug, %		0 (0)			20 (2)			60 (6)			80 (8)			50 (5)			0 (0)	
Use of diuretics, %		0 (0)			30 (3)			70 (7)			40 (4)			20 (2)			30 (3)	

Values are described as median (IQR) or % (count). RASi, renin-angiotensin system inhibitors.