

Supplementary Table S1. Clinical and serological features of autoimmune disease patients with and without ILD.

	RA, n=145			AAV, n=116			MCTD, n=115			OS, n=60		
	ILD (+)	ILD (-)	p-value	ILD (+)	ILD (-)	p-value	ILD (+)	ILD (-)	p-value	ILD (+)	ILD (-)	p-value
n	41	104	NA	39	77	NA	29	86	NA	44	16	NA
Age, mean $\pm$ SD	64.05 $\pm$ 9.505	54.57 $\pm$ 13.35	0.0001	62.08 $\pm$ 14.25	49.87 $\pm$ 19.24	0.0003	55.48 $\pm$ 15.67	44.53 $\pm$ 16.46	0.0022	47.02 $\pm$ 13.97	43.13 $\pm$ 14.54	0.3723
Female, n (%)	28 (68.3)	80 (76.9)	0.283	11 (28.2)	47 (61)	0.0008	20 (69)	66 (76.7)	0.4042	39 (88.6)	14 (87.5)	0.9035
ANA, n (%)	21 (51.2)	62 (59.6)	0.3574	16 (41)	27 (35.1)	0.5301	21 (72.4)	75 (87.2)	0.0636	40 (90.9)	15 (93.8)	0.7248
SSA/Ro60, n (%)	8 (19.5)	23 (22.1)	0.7306	2 (5.1)	9 (11.7)	0.2546	3 (10.3)	35 (40.7)	0.0027	21 (47.7)	4 (25)	0.1143
Ro 52, n (%)	8 (19.5)	27 (26)	0.4138	5 (12.8)	18 (23.4)	0.1779	11 (37.9)	48 (55.8)	0.0957	35 (79.5)	9 (56.2)	0.0712
dsDNA-CLIA, n (%)	3 (7.3)	4 (3.8)	0.3799	2 (5.1)	2 (2.6)	0.4804	1 (3.4)	6 (7)	0.4919	5 (11.4)	0 (0)	0.159
PCNA, n (%)	0 (0)	2 (1.9)	0.3712	0 (0)	2 (2.6)	0.31	1 (3.4)	3 (3.5)	0.9919	1 (2.3)	1 (6.2)	0.4479
ANuA, n (%)	1 (2.4)	3 (2.9)	0.8827	1 (2.6)	0 (0)	0.1582	0 (0)	2 (2.3)	0.4074	3 (6.8)	0 (0)	0.2839
SSB, n (%)	1 (2.4)	3 (2.9)	0.8827	0 (0)	4 (5.2)	0.1475	0 (0)	9 (10.5)	0.0696	5 (11.4)	1 (6.2)	0.5593
PM-Scl, n (%)	0 (0)	1 (1)	0.5287	2 (5.1)	1 (1.3)	0.2196	0 (0)	0 (0)	NA	1 (2.3)	1 (6.2)	0.4479
CENP B, n (%)	3 (7.3)	5 (4.8)	0.5512	0 (0)	3 (3.9)	0.2117	0 (0)	11 (12.8)	0.0630	7 (15.9)	0 (0)	0.0896
AHA, n (%)	1 (2.4)	2 (1.9)	0.8442	2 (5.1)	2 (2.6)	0.4804	1 (3.4)	3 (3.5)	0.9919	4 (9.1)	0 (0)	0.2119
RNP, n (%)	2 (4.9)	1 (1)	0.1357	0 (0)	1 (1.3)	0.4748	6 (20.7)	19 (22.1)	0.8741	19 (43.2)	8 (50)	0.6387
Sm, n (%)	0 (0)	1 (1)	0.5287	1 (2.6)	0 (0)	0.1582	0 (0)	4 (4.7)	0.2372	4 (9.1)	0 (0)	0.2119
Scl-70, n (%)	2 (4.9)	0 (0)	0.0785	0 (0)	0 (0)	NA	0 (0)	1 (1.2)	0.5597	6 (13.6)	0 (0)	0.1195
Jo-1, n (%)	0 (0)	4 (3.8)	0.2029	1 (2.6)	1 (1.3)	0.6209	0 (0)	0 (0)	NA	5 (11.4)	1 (6.2)	0.5593
rRNP, n (%)	0 (0)	3 (2.9)	0.2718	0 (0)	1 (1.3)	0.4748	1 (3.4)	2 (2.3)	0.7429	2 (4.5)	0 (0)	0.3857

Data are presented as frequency (percentage) for categorical variables and mean $\pm$ standard deviation (SD) for continuous variables. *p*-values were calculated using the Chi-squared test or Fisher's exact test for categorical variables and the Mann-Whitney U-test for comparisons of continuous variables between two independent groups.

RA: rheumatoid arthritis; AAV: anti-neutrophil cytoplasmic antibody-associated vasculitis; MCTD: mixed connective tissue disease; OS: overlap syndrome; n: number; SD: standard deviation; ILD: interstitial lung disease; ANA: antinuclear antibody; SSA/Ro60: anti-SSA/Ro60 antibody; Ro 52: anti-Ro52 antibody; dsDNA-CLIA: double-stranded DNA-chemiluminescent immunoassay; PCNA: anti-proliferating cell nuclear antigen antibody; ANuA: anti-nucleosome antibody; SSB: anti-SSB antibody; PM-Scl: anti-PM-Scl antibody; CENP B: anti-centromere protein B antibody; AHA: anti-histone antibody; RNP: anti-ribonucleoprotein antibody; Sm: anti-Sm antibody; Scl-70: anti-Scl-70 antibody; Jo-1: anti-Jo-1 antibody; rRNP: anti-ribosomal RNP antibody.

Supplementary Table S2. Disease-specific Cox analysis for anti-Ro60 and ILD progression.

Disease subtype	Follow-up ILD patients (n)	Anti-Ro60 positive, n (%)	HR (95% CI)	p-value
IIM	88	26 (29.5%)	1.640 (0.855-3.146)	0.1364
SjD	29	20 (69.0%)	0.613 (0.204-1.839)	0.3826
SLE	41	25 (61.0%)	0.985 (0.235-4.123)	0.9833
RA	23	6 (26.1%)	0.722 (0.081-6.463)	0.7711
SSc	28	8 (28.6%)	1.466 (0.268-8.017)	0.6589
AAV	23	2 (8.7%)	0.851 (0.110-6.564)	0.8770
MCTD	12	1 (8.3%)	1.259 (0.150-10.553)	0.8317
OS	36	17 (47.2%)	1.606 (0.597-4.321)	0.3481
Overall AID	280	105 (37.5%)	1.077 (0.732-1.585)	0.7079

Data are presented as frequency (percentage) for categorical variables. Cox regression analysis was performed to evaluate the association between risk factors and ILD progression. ILD: interstitial lung disease; SjD: Sjögren's disease; IIM: idiopathic inflammatory myopathies; SLE: systemic lupus erythematosus; RA: rheumatoid arthritis; SSc: systemic sclerosis; AAV: anti-neutrophil cytoplasmic antibody-associated vasculitis; MCTD: mixed connective tissue disease; OS: overlap syndrome; n: number; HR: hazard ratio; CI: confidence interval.

Supplementary Table S3. Model performance and variable selection for ILD prediction in IIM patients.

Num_Vars	AUC	BIC	Variables
1	0.688889	182.5513	MDA5
2	0.840329	162.41	MDA5, age
3	0.886831	146.0085	MDA5, age, Ro52
4	0.900905	146.7289	MDA5, age, Ro52, TIF1g
5	0.908066	148.0593	MDA5, age, Ro52, TIF1g, PL-7
6	0.919177	147.638	MDA5, age, Ro52, TIF1g, PL-7, Jo-1
7	0.921646	149.4547	MDA5, age, Ro52, TIF1g, PL-7, Jo-1, EJ
8	0.925267	151.9032	MDA5, age, Ro52, TIF1g, PL-7, Jo-1, EJ, OJ
9	0.927654	155.4417	MDA5, age, Ro52, TIF1g, PL-7, Jo-1, EJ, OJ, PL-12
10	0.927572	159.8572	MDA5, age, Ro52, TIF1g, PL-7, Jo-1, EJ, OJ, PL-12, SRP
11	0.927654	165.0129	MDA5, age, Ro52, TIF1g, PL-7, Jo-1, EJ, OJ, PL-12, SRP, PM75
12	0.93358	168.1763	MDA5, age, Ro52, TIF1g, PL-7, Jo-1, EJ, OJ, PL-12, SRP, PM75, PM100
13	0.933416	173.3599	MDA5, age, Ro52, TIF1g, PL-7, Jo-1, EJ, OJ, PL-12, SRP, PM75, PM100, Ku