Anti-Threonyl-tRNA synthetase autoantibodies (PL7)

Synonyms anti-PL7 (PL: precipitation line)

Indications
- Dermatomyositis
- Polymyositis
- PM/DM-overlap syndromes with other connective tissue diseases
- Antisynthetase syndrome
- Interstitial lung disease
- Raynaud's phenomenon (active stage, before starting therapy)

see also Autoantibodies in idiopathic inflammatory myopathies

Antigens The threonyl-tRNA synthetase (EC 6.1.1.3; M_r 82,1kDa; chromosome 5p13.2) belongs to the family of aminoacil tRNA synthetases, which catalyze the ester bound of amino acids to their specific transport RNA (tRNA). The latter ones are engaged in the transport of amino acids for their assembly into the nascent polypeptide chain within the ribosomes.

Autoantibodies The indirect immunofluorescence test (HEp-2-cells) of sera containing anti-tRNA synthetase antibodies reveals an exclusive cytoplasmic fluorescence pattern. The anti-PL7 antibodies react with multiple conformational and conformation independent epitopes of the antigen. Some antibodies also recognize the catalytic domain of the synthetase and inhibit its catalytic activity *in vitro*. The antibodies largely belong to the immunoglobulin isotype IgG. Quite often patients harboring antibodies reacting against the synthetase also develop antibodies against the respective tRNA.

Prevalence Antibodies against the alanyl-tRNA synthetase can be detected in up to 5 % of adult patients manifesting polymyositis/dermatomyositis and/or myositis associated interstitial lung disease. In adults the antibodies can be detected early in the beginning of the disease and sometimes also prior to the onset of the clinical manifestations.

Clinic Patients exhibiting antibodies against threonyl-tRNA synthetase may develop an antisynthetase syndrome, which presents themself with varying symptoms of myositis, interstitial lung disease, arthritis, so called "mechanic hands" (rough, cracked skin at the tips and lateral aspects of the fingers forming irregular dirty-appearing fissures because of hyperkeratosis), Raynaud's phenomenon, sclerodactyly, calcinosis cutis and sicca-syndrome. The clinical manifestations of the antisynthetase syndromes may vary according to the antigen specificity of the respective anti-synthetase antibodies (table 1).

Table 1 Clinical manifestations in anti-PL7 positive patients (Hamaguchi et al. 2013).

DM	CADM	PM	DM/PM-OM	SSc	ILD	LES
48 %	7 %	24 %	7 %	-	14 %	-

DM	dermatomyositis
CADM	cinically amyopathic dermatomyositis
DM/PM-OM	DM/PM-overlap
PM	polymyositis
SSC	systemic sclerosis
ILD	interstitial lung disease
SLE	systemic lupus erythematosus

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Autoantibodies against tRNA synthetases are mutually exclusive. The simultaneous occurrence of two ant-tRNA-synthetase antibodies of different antigen specificities is extremely rare. But their association with antibodies not specific for myositis, so called myositis-associated antibodies (MAA), directed against topoisomerase, centromeres, U1snRNP, Th/To, U3snRNP, Sm, SS-A/Ro 52 or SS-A/La may be seen quite often.

Literature

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