Why the SmD_3 peptide is more accurate for SLE

Specificity without sacrificing sensitivity: that's why the Thermo Scientific™ EliA™ SmD^P-S test is highly effective for distinguishing systemic lupus erythematosus (SLE) from other connective tissue diseases (CTDs). This increased accuracy is achieved with the help of our synthetic SmD_3 peptide. Let's take a closer look at how this peptide increases our test's specificity.

The path to diagnosis

RNA-bound protein complexes such as small nuclear ribonucleoproteins (snRNPs) serve as antigens for autoantibody markers for several CTDs. One such example is U1-snRNP. This immunogenic complex includes several bound proteins, U1-RNP-70kDa, U1-RNP-A, U1-RNP-C, and the seven-core Sm proteins, all of which act as unique antigenic sites on U1-snRNP.[1]

Antibodies against U1-RNP-70kDa, U1-RNP-A, and U1-RNP-C are markers for mixed connective tissue disease (MCTD) but can also be present in patients with SLE and other CTDs.[2] On the other hand, antibodies against the Sm core protein complex are thought to be more specific for diagnosing SLE.[2] Thus, tests that differentiate between U1-snRNP proteins can help increase the accuracy of an SLE diagnosis.

The Sm antigen is comprised of several subunits including SmBB' and SmD, which are the most reactive subunits to SLE antibodies.[3,4] However, SmBB' is also cross-reactive for MCTD, whereas SmD has the least cross-reactivity (figure 1).[4] Antibodies against other Sm subunits are detected less frequently and are less reactive for SLE.[5]

Within the SmD subfamily, SmD3 has high reactivity for SLE antibodies and the least cross-reactivity for other autoimmune disorders.[4] SmD1 is less specific since it is reactive for both Sm and dsDNA antibodies.[4] Compared to the other Sm subunits, SmD3 is regarded as the most specific Sm-antigen, and can be used to discriminate MCTD from SLE patients.[6]

Improving anti-Sm tests with SmD_3 peptide.

The purification of sufficient amounts of SmD from native sources is very difficult. Often, native SmD is contaminated with SmBB', ultimately decreasing its specificity for SLE.[6] In 2004, a synthetic peptide—SmD_3—was produced that contains the main epitope of anti-SmD antibodies. The use of the synthetic SmD_3 peptide guarantees that there will be no traces of SmBB' or other native material from U1-snRNP.[4,6]

Compared to anti-Sm tests using native SmD, tests using the SmD_3 peptide showed a similar sensitivity but a significantly higher specificity.[6]

Takeaway: Our synthetic SmD_3 peptide enables the specific detection of anti-SmD antibodies and increases the accuracy for diagnosing SLE.

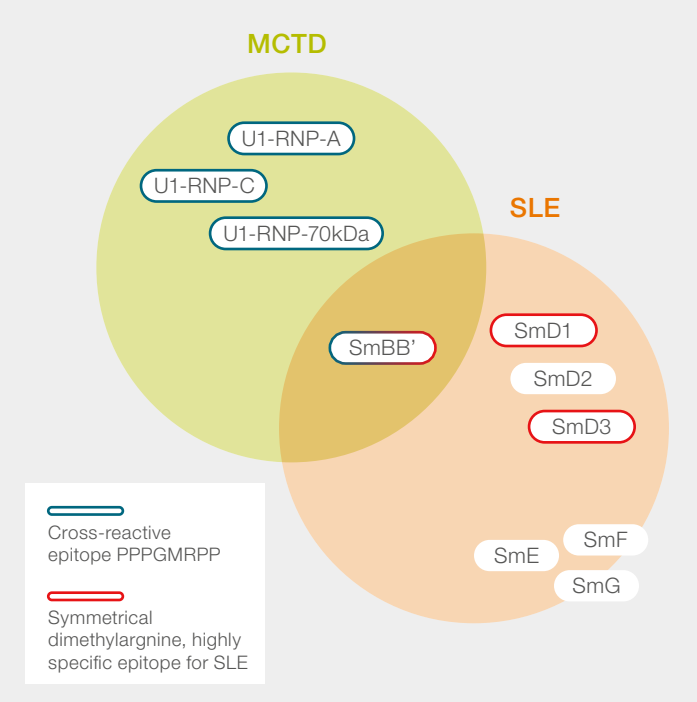

Figure 1: Anti-Sm/RNP reactivity in SLE and MCTD. The anti-Sm/RNP reactivity in SLE is primarily directed against SmBB', SmD1, and SmD3, all containing symmetrical dimethylarginine. Since SmBB' also contains a cross-reactive epitope, SmBB' is also the target of autoantibodies in MCTD.[4]

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The state-of-the-art SmD_3 antigen has been further enhanced in the EliA SmD^P-S test

An integral part of your diagnostic algorithm for systemic lupus erythematosus

In 2012 we launched the Thermo Scientific™ EliA™ SmD^P test using the state-of-the-art antigen, synthetic SmD_3 peptide, which is the most specific biomarker for Sm antibodies.[3] Since positive anti-Sm results are often used as a deciding factor for SLE diagnosis, we developed a test with even greater specificity.

The Thermo Scientific™ EliA™ SmD^P-S test utilizes the SmD_3 peptide antigen in combination with an innovative coating for reliable and consistent test results. This coating is a tailor-made solution for presenting the synthetic SmD_3 peptide antigen. Antibodies reacting to the SmD_3 peptide have greater specificity for SLE and represent a highly efficient marker for the distinction of SLE from MCTD.[6]

While sensitivity remains the same, the breakthrough is improving specificity from 97.2% to 98.3%, resulting in a 65.5% greater positive likelihood ratio (table 1). The improved clinical utility of EliA™ SmD^P-S supports diagnostic algorithms with added confidence for diagnosing SLE.

Table 1. Comparison of EliA SmD^P with EliA SmD^P-S using 197 sera from SLE patients and 536 disease controls. (Thermo Fisher Scientific, internal data)

Cohort n=733	EliA SmD^P-S	EliA SmD^P
Specificity	98.3%	97.2%
Positive Likelihood Ratio	9.6	5.8
Positive Predictive Value	77.8%	68.1%

Technical data

			Cut-off			
Ordering Information	**Article No.**	**Package size**	**Negative**	**Equivocal**	**Positive**	**Abbreviation**
EliA SmD^P-S	14-5672-01	4 x 16 wells	< 7 U/ml	7-10 U/ml	>10 U/ml	sms

References

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