Autoantibodies against Sm Proteins

In eukaryotic cells, the spliceosomal complex catalyzes the splicing of nuclear pre-mRNA. The small nuclear ribonucleoprotein complexes (snRNPs) are a key component of this complex. Each snRNP consists of a non-coding small uridylate-rich nuclear ribonucleic acid (snRNA), either U1, U2, U4/U6, or U5, complexed with unique RNP proteins and seven so-called Sm proteins (B/B', D1, D2, D3, E, F, G). These Sm proteins, which range in their molecular weight from 9 to 29.5 kDa, form a protein core that is shared between all snRNPs.

Autoantibodies against both RNP and Sm proteins have been identified in patients diagnosed with systemic lupus erythematosus (SLE). This disease is a chronic, inflammatory autoimmune connective tissue disease, which can affect virtually any part of the human body. While RNP autoantibodies are also present in patients diagnosed with mixed connective tissue disease (MCTD), Sm autoantibodies are considered to be a specific marker for SLE and are detected in 20-40% of the patients. Intriguingly, two studies published by Arbuckle *et al.* (2003) and Heinlen *et al.* (2010) reported that Sm autoantibodies are detectable in 32-44% of patient sera approximately 1.5 years prior to the onset of disease specific symptoms. This further highlights their importance as serological markers.

Albeit Sm autoantibodies against all Sm proteins have been found in patient sera, the SmB/B' and SmD proteins represent the predominant antigens. In general, SmD proteins are regarded the most SLE-specific antigens. A specific feature of the SmD1, SmD3, and SmB/B' proteins is the symmetrical dimethylation of arginine residues by protein arginine methyltransferase 5 (PRMT5), a type II methyltransferase. Besides being involved in regulating snRNP assembly, work reported by Brahms *et al.* (2000) showed that this symmetrical dimethylation form represents a major epitope for SmD1 and SmD3 autoantibodies.

To date, the Sm protein core is purified from native sources to obtain antigens for diagnostic serology. However, this does not allow to discriminate the autoantibody specificities against individual Sm proteins, especially SmD proteins.

DIARECT produces SmD1, SmD2, and SmD3 in the baculovirus/insect cell system and has applied its recombinant protein technology to achieve for the first time the symmetrical dimethylation of both SmD1 and SmD3. All three SmD proteins are available as separate parameters or as a mixture (SmD), which contains equal masses of each protein.

To complete its product portfolio, DIARECT offers native, non recombinant Sm proteins and native, non recombinant RNP/Sm ribonucleoprotein complex purified from bovine tissue.

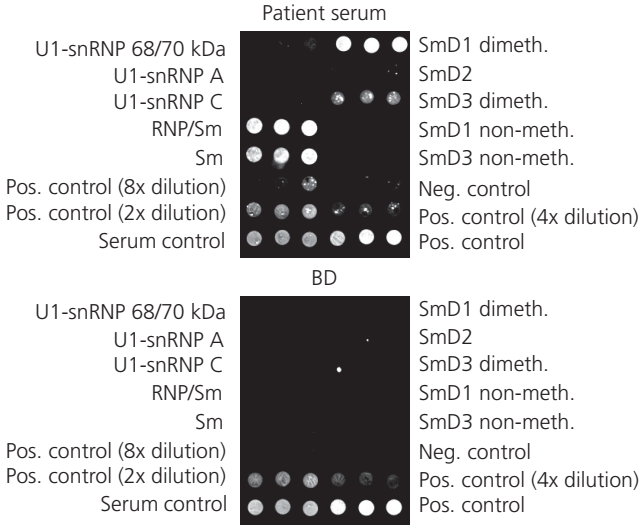

Figure: Microarray analysis of serum from a blood donor (BD; lower panel) and a patient (upper panel) for the presence of RNP and Sm protein autoantibodies. Besides symmetrically dimethylated (dimeth.) and non-methylated (non-meth). SmD1 and SmD3, SmD2, Sm and RNP/Sm purified from bovine tissue, as well as recombinant U1-snRNP specific proteins 68/70, A and C were included.

Ordering Information		
17500	Sm (non recombinant; bovine)	0.1 mg
17501		1.0 mg
11600	RNP/Sm (non recombinant; bovine)	0.1 mg
11601		1.0 mg
11700	SmD	0.1 mg
11701		1.0 mg
11800	SmD1	0.1 mg
11801		1.0 mg
11900	SmD2	0.1 mg
11901		1.0 mg
12000	SmD3	0.1 mg
12001		1.0 mg

References:
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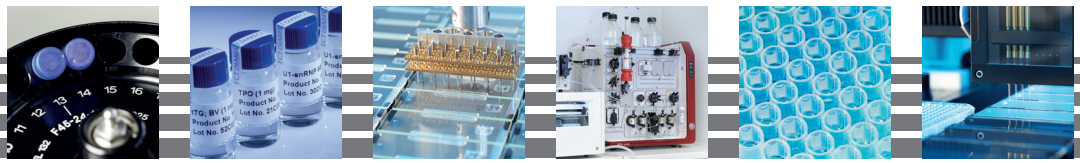

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