DIARECT
Part of BBI Solutions

# Sm, RNP/Sm and recombinant SmD Antigens

The small nuclear ribonucleoprotein complexes (snRNPs) are a key component of the eukaryotic spliceosomal 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 (Miglorini *et al.* 2005; Will and Lührmann 2011).

Autoantibodies against both, RNP and Sm proteins have been identified in patients diagnosed with systemic lupus erythematosus (SLE) (Miglorini *et al.* 2005). 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 (Miglorini *et al.* 2005). Intriguingly, two studies (Arbuckle *et al.* 2003; Heinlen *et al.* 2010) reported that Sm autoantibodies are detectable in 32–44% of patient sera ~1.5 years prior to the onset of disease specific symptoms. This further highlights their importance as serological markers.

Albeit autoantibodies against all Sm proteins have been found in patient sera, the SmB/B' and SmD proteins represent the predominant antigens (Brahms *et al.* 2000). 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 (Blackwell and Ceman 2012; Brahms *et al.* 2000). Besides being involved in regulating snRNP assembly, Brahms *et al.* (2000; 2001) 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 expression 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 RNP/Sm ribonucleoprotein complex purified from bovine tissue.

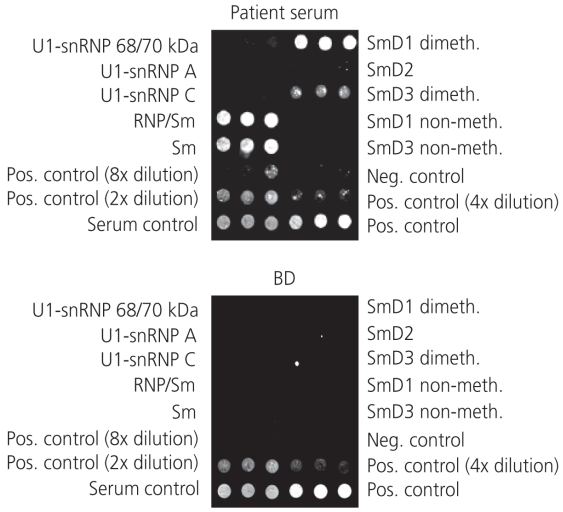



*Figure: Microarray analysis of serum from a blood donor (BD; lower panel) and a patient (upper panel) for the presence of RNP and Sm protein autoantibodies. Besides symmetrically dimethylated (dimeth.) and non-methylated (non-meth.) SmD1 and SmD3, SmD2, Sm and RNP/Sm purified from bovine tissue, as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

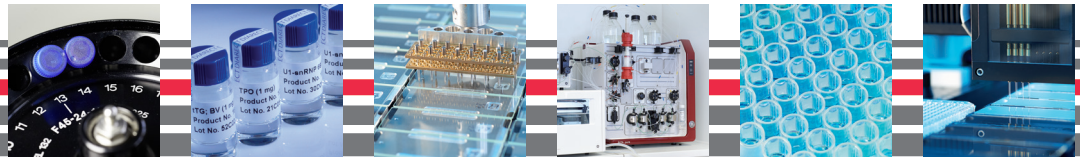
## Ordering Information

| | | |
|---|---|---|
| 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 |
| 13300 | U-snRNP B/B' | 0.1 mg |
| 13301 | | 1.0 mg |


References:
Arbuckle *et al.* (2003) N Engl J Med. 349 (16): 1526-1533
Blackwell and Ceman (2012) Mol Reprod Dev. 79 (3): 163-175
Brahms *et al.* (2000) J Biol Chem. 275 (22): 17122-17129
Brahms *et al.* (2001) RNA. 7 (11): 1531-1542
Cozzani *et al.* (2014) Autoimmune Dis. 2014: 321359
Miglorini *et al.* (2005) Autoimmunity. 38 (1):47-54
Heinlen *et al.* (2010) PloS One. 5 (3): e9599
Will a. Lührmann (2011) Cold Spring Harb Perspect Biol. 3 (7). pii: a003707.



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