

Autoantibodies against Thyroid Peroxidase and Thyroglobulin

Thyroid peroxidase (TPO) represents one of the main autoantigens in human autoimmune thyroid disease that affects up to 5% of the general population. Several years ago, it has been shown that TPO and the so-called "microsomal antigen" are identical. TPO is an integral membrane glycoprotein, which is composed of two identical subunits of approx. 100 kDa each, and restricted to the apical plasma membrane of the follicular epithelial cells. The hemoprotein TPO plays a key role in thyroid hormone biosynthesis by catalyzing both the iodination of tyrosyl residues and the coupling of iodotyrosyl residues in thyroglobulin (TG) to form precursors of the thyroid hormones T4 and T3.

TPO autoantibodies, the serological hallmark of human autoimmune thyroid disease, are found with a prevalence of over 90% in patients with Hashimoto thyroiditis, which is now considered one of the most common autoimmune diseases with an annual incidence of up to 1.5 cases per 1000 individuals. In patients diagnosed with the related Grave's disease, TPO autoantibodies are detected at a lower prevalence ranging from 70 to 90%. A recent study published by Hutfless *et al.* in 2011 reported that TPO autoantibodies precede by years the diagnostic symptoms associated with the autoimmune thyroid disease phenotype.

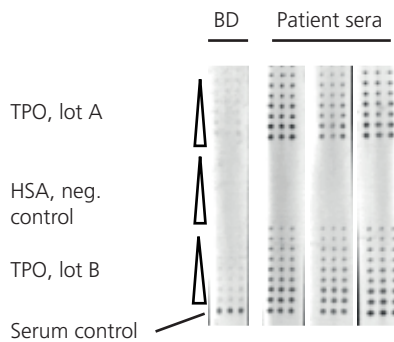
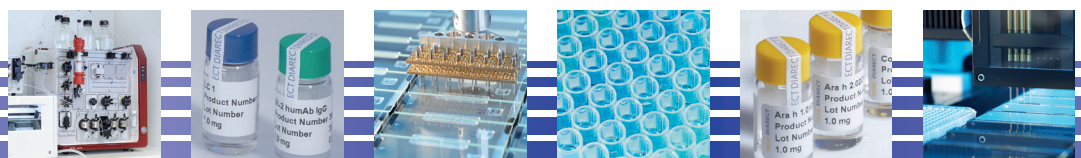


Figure 1: Immunodot analyses of increasing amounts of two different lots of recombinant TPO using sera from a blood donor (BD) and patients with Hashimoto thyroiditis. To ensure specific antibody binding, human serum albumin (HSA) as negative control and a serum control were also spotted on the nitrocellulose membrane.

Ordering Information

12100	Thyroid Peroxidase (TPO)	0.1 mg
12101		1.0 mg
12200	Thyroglobulin (non recombinant)	0.1 mg
12201		1.0 mg

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DIARECT's TPO antigen is produced in the baculovirus/insect cell expression system as a truncated, soluble molecule comprising the extracytoplasmic domain that contains the epitope targeted by TPO autoantibodies. The recombinant production of an engineered TPO antigen did eliminate the purity problems of the classical microsomal antigen preparations from thyroid follicles, which are inevitably contaminated with thyroglobulin.

Thyroglobulin is a large globular, dimeric glycoprotein with a total molecular weight of 660 kDa, and a key precursor in the biosynthesis of the thyroid hormones. It makes up approximately 75% of the thyroid follicles' protein content and represents another major thyroid autoantigen with up to 80% of Hashimoto thyroiditis and Graves' disease patients being serologically positive. Like for TPO autoantibodies, Hutfless *et al.* (2011) reported that thyroglobulin autoantibodies precede the development of diagnostic symptoms.

DIARECT produces native thyroglobulin purified from human thyroid glands.

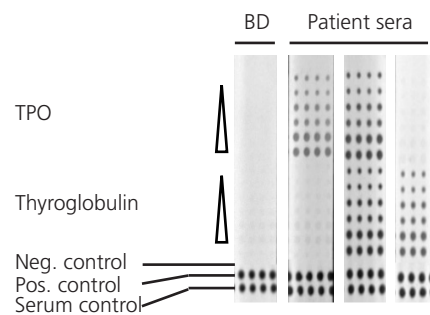


Figure 2: Immunodot analyses of increasing amounts of recombinant TPO and native thyroglobulin using sera from a blood donor (BD) and patients with Hashimoto thyroiditis.

References:

- Caturegli *et al.* (2014) *Autoimmun Rev.* 13:391-397
- Cooper *et al.* (2009) *J Autoimmun.* 33:197-207
- Haubruck *et al.* (1993) *Autoimmunity.* 15:275-284
- Hutfless *et al.* (2011) *J Clin Endocrinol Metab.* 96:E1466-E1471
- Iddah *et al.* (2013) *ISRN Endocrinol.* 2013:509764
- Menconi *et al.* (2014) *Autoimmun Rev.* 13:398-402
- Portmann *et al.* (1988) *J Clin Invest.* 81: 1217-1224

In some countries the use of certain antigens in diagnostic tests may be protected by patents. DIARECT is not responsible for the determination of these issues and suggests clarification prior to use.