



THYROID PEROXIDASE (TPO)

FUNCTION:

Thyroid peroxidase (TPO) is an enzyme expressed mainly in the thyroid that frees iodine for its addition onto thyroglobulin tyrosine residues for the production of thyroxine (T4) or triiodothyronine (T3), thyroid hormones. Some TPO antibodies may lyse thyroid cells or inhibit TPO enzyme activity, *in vitro*^{2,7} but in general it is considered an antibody response to thyroid damage inflicted by T-Cells.

ANTIBODIES APPEAR:

Autoimmune Thyroid Disease^{1,3,5,6}
 Graves' Disease³
 Hashimoto's Thyroiditis²
 Vitiligo^{3,4}

KNOWN CROSS-REACTIONS:

Thyroglobulin⁹

CLINICAL SIGNIFICANCE:

Autoimmunity occurs when antibodies against TPO cause gradual destruction of follicles in the thyroid gland, and decrease assimilation of thyroid hormones into the cells.^{5,6,8} Elevated antibodies to TPO are often associated with a hypothyroid condition called Hashimoto's Disease. It is important to note that TPO antibodies can be detected in circulation long before the change of thyroid function can be observed by changes in the TSH levels.¹ Additionally, Vitiligo often precedes thyroid dysfunction,³ and thus Vitiligo patients should be screened for thyroid disorders. Researchers have shown that there is an increased risk of autoimmune and/or endocrine disorders in first and second degree relatives of vitiligo patients with positive organ-specific antibodies.⁴

References:

1. Bjørø T, et al. Prevalence of thyroid disease, thyroid dysfunction and thyroid peroxidase antibodies in a large, unselected population. The study on health Nord-Trøndelag (HUNT). *Eur J Endocrinol*, 2000; 143:639-647.
2. Chiovato L, et al. Antibodies producing complement-mediated thyroid cytotoxicity in patients with atrophic or goitrous autoimmune thyroiditis. *J Clin Endocrinol Metab*, 1993; 77(6):1700-1705.
3. Daneshpazhooh M, et al. Anti-thyroid peroxidase antibody and vitiligo: a controlled study. *BMC Dermatol*, 2006; 6(3):1-5.
4. Grimes PE, et al. Autoantibodies and their clinical significance in a black vitiligo population. *Arch Dermatol*, 1983; 119:300-303.
5. Guo J, et al. Search for the Autoantibody Immunodominant Region on Thyroid Peroxidase: Epitopic Footprinting with a Human Monoclonal Autoantibody Locates a Facet on the Native Antigen Containing a Highly Conformational Epitope. *J Immunol*, 2001; 166:1327-1333.
6. Kaczur V, et al. Effect of anti-thyroid peroxidase (TPO) antibodies on TPO activity measured by chemiluminescence assay. *Clin Chem*, 1997; 43(8):1392-1396.
7. Kohno Y, et al. Anti-thyroid peroxidase antibodies in sera from healthy subjects and from patients with chronic thyroiditis: differences in the ability to inhibit thyroid peroxidase activities. *Clin Exp Immunol*, 1991; 85(3):459-463.
8. Roddiger SJ, et al. Detection of thyroid peroxidase mRNA in peripheral blood of patients with malignant and benign thyroid diseases. *J Molec Endocrinol*, 2002; 29:287-295.
9. Thrasyvoulides and Lymberi P. Antibodies cross-reacting with thyroglobulin and thyroid peroxidase are induced by immunization of rabbits with an immunogenic thyroglobulin 20mer peptide. *Clin Exp Immuno*, 2004; 138(3):423-429.