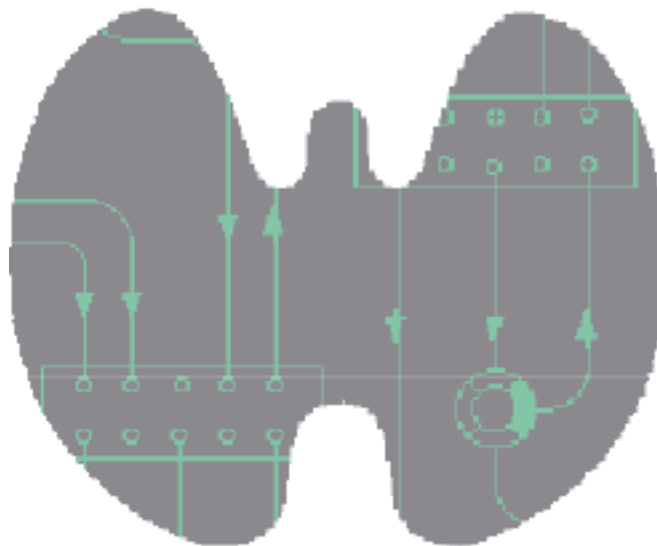


SPINA Thyr 4.0

Short introduction



SPINA (structure parameter inference approach) is a cybernetic method for advanced interpretation of laboratory results. It allows for calculating constant structure parameters of endocrine feedback control systems *in vivo* from hormone levels that have been obtained from serum or plasma specimens. The method is based on mathematical and cybernetic modelling of processing structures [1, 2].

A first successful implementation applies to evaluation of thyroid function. It delivers thyroid's maximum secretory capacity (G_T or SPINA-GT) and sum activity of peripheral 5'-deiodinases (G_D or SPINA-GD) from levels of TSH, (F)T4 and (F)T3 that have been determined once only (SPINA Thyr).

SPINA Thyr has been evaluated in clinical trials covering more than 10000 subjects with various disorders of thyroid homeostasis. G_T has been demonstrated to correlate with thyroid function [3, 4] and gland volume as obtained via ultrasonography [5]. Its retest reliability is higher than that of TSH, FT4 or FT3 [6].

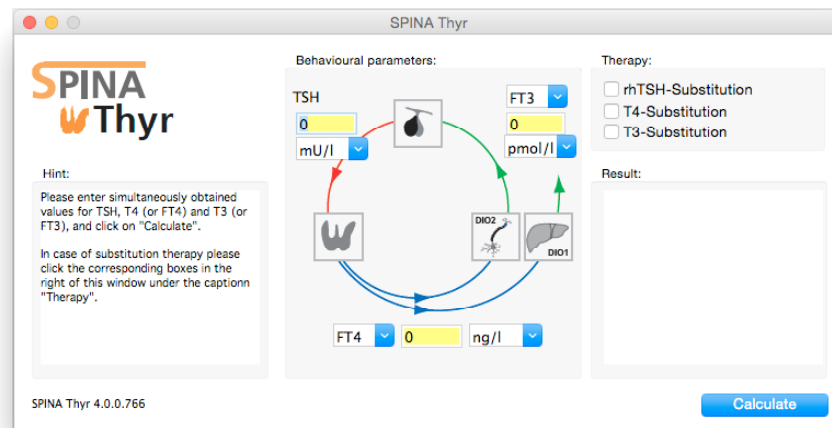
G_D is reduced in nonthyroidal illness syndrome (NTIS) and increased in states of hyperdeiodination [7-9], and it correlated in two large trials with TSH levels, thus mirroring intracellular cAMP levels [10, 11].

These structure parameters may therefore contribute to diagnosis of rare or at least less obvious thyroid disorders.

In addition to G_T and G_D SPINA Thyr is able to calculate TTSI and Jostel's TSH index, two static function tests for the assessment of pituitary function [12, 13].

Starting SPINA

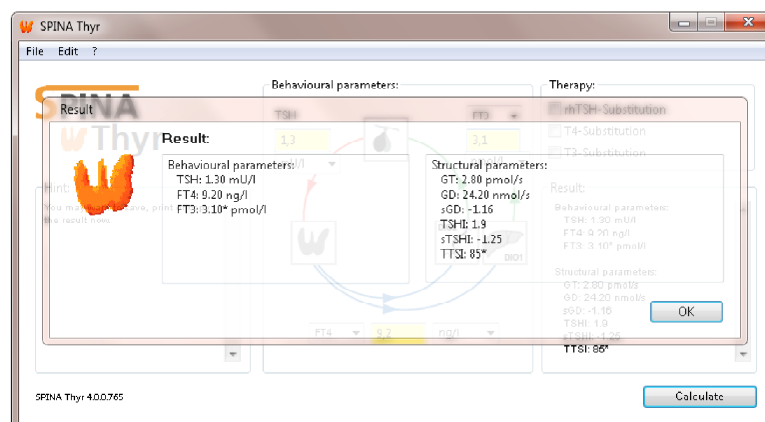
Start SPINA Thyr by double-clicking its icon. After a short while a dialog box asking for hormone values is presented:



When first run SPINA creates a set of new preferences including standard reference values for thyrotropin, thyroid hormones, structure parameters and measurement units.

Calculating

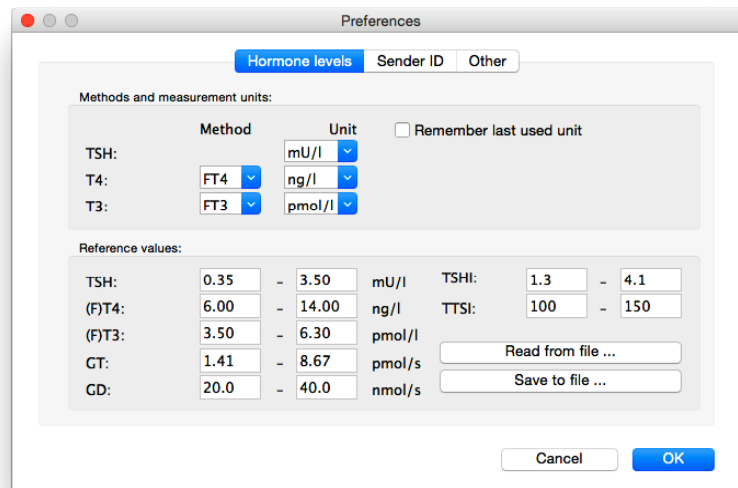
Before using SPINA it is recommended to check and adjust laboratory methods (i.e. free or total hormones) and measurement units as required. Subsequently you may enter hormone values of your patient or proband and click the button labelled **Calculate**. This will cause SPINA to calculate structure parameters and to display the results in a dialog box.



You may want to print the results via corresponding commands from the menu bar or the tool button palette. It is also possible to export results of calculation as text file or HL7 message.

Preferences

The preferences window (accessible via the application menu on Mac OS X or the edit menu on Windows or Linux) provides you with options to adjust global measurement units. From this window you may also import reference values from XML files according to the CDISC laboratory data model (CDISC LAB Base model version 1.0.1).



Important hints

Hormone levels should have been obtained simultaneously in order to avoid bias by transition effects.

Calculating G_T in patients that are treated with levothyroxine (L-T₄) is of little, if any, value. Likewise it is not recommended to calculate G_D in patients that receive substitution therapy with liothyronine (L-T₃) or triiodothyroacetate (TRIAC). It may be interesting, however, to obtain a value for the unaffected structural parameter in affected cases, e.g. for SPINA-GD in patients on L-T₄ substitution. You may select the appropriate check boxes for substitution therapy in the upper right of the main window in this situation. This causes SPINA Thyr to suppress calculation of parameters that would be misleading.

Usage of SPINA implies that you agree to its license and conditions with respect of the council directive 93/42/EEC of the European Union. This information is included with the license file that comes with SPINA Thyr, and it is available online from <http://spina.sf.net>.

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More information and a comprehensive manual are available from <http://spina.sf.net>.