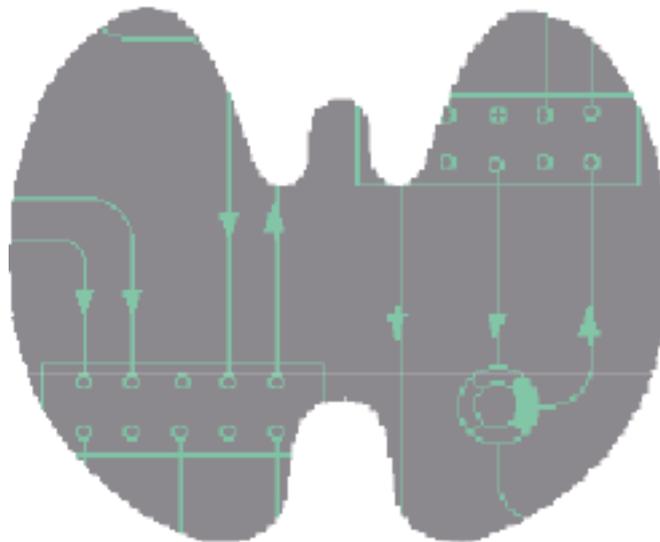


# SPINA Thyr 3.3

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## Short introduction



SPINA (structure parameter inference approach) is a method 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 allows for calculating the thyroid's maximum secretory capacity ( $G_T$ ) and the sum activity of peripheral 5'-deiodinases ( $G_D$ ) from levels of TSH, (F)T4 and (F)T3 that have been determined once only (SPINA Thyr).

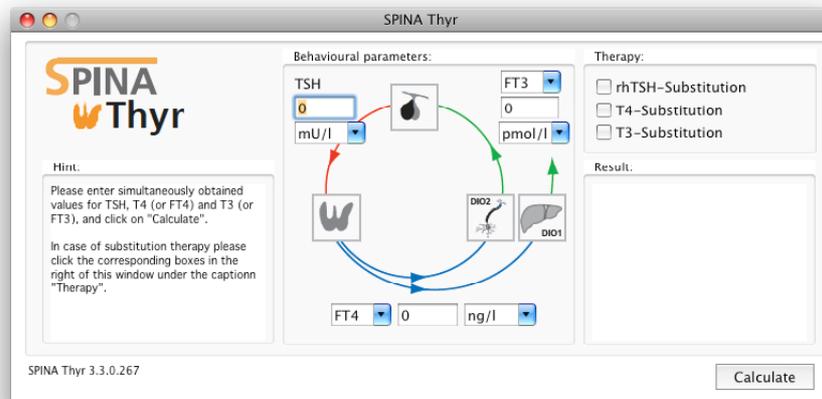
Estimated  $G_T$  (SPINA-GT) has been demonstrated to correlate with thyroid function [3, 4] and gland volume as obtained via ultrasonography [5]. Its retest reliability is higher than that of TSH, FT4 or FT3 [6].

Calculated  $G_D$  (SPINA-GD) is reduced in nonthyroidal illness syndrome (NTIS) and increased in states of hyperdeiodination [7-9].

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

## Starting SPINA

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

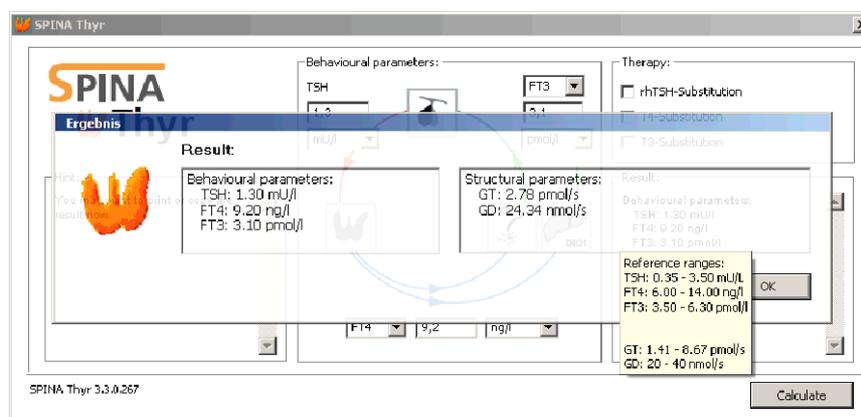


When first run SPINA creates a set of new preferences including standard reference values for structure parameters and measurement units.

## Calculating

Before using SPINA it is recommended to check and adjust laboratory methods (i.e. free or total hormones) and measurement units as required. It is possible to import sets of reference ranges (see below).

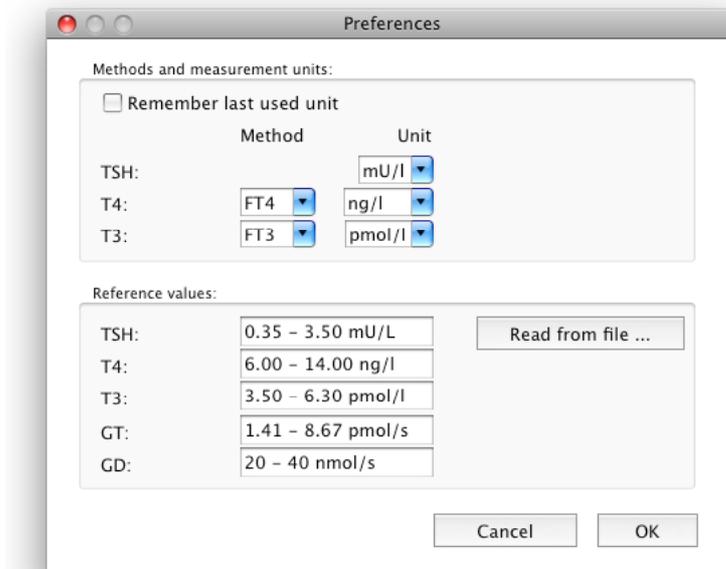
Subsequently you may enter hormone values of your patient and click the button labelled **Calculate**. This will cause SPINA to calculate structure parameters and to display the results in a dialog box.



You may want to print the results via corresponding commands from the menu bar or the tool button palette.

## 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 is of little, if any, value. Likewise it is not recommended to calculate  $G_D$  if the patient receives a substitution therapy with liothyronine. It may be interesting, however, to obtain a value for the unaffected structural parameter in affected cases. 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 available online from <http://spina.sf.net>.

## References

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