

Two Tissue Compartmental Model manual (Beta)

In this brief manual you will find 5 simple steps to run the 2 TCM which it is in its beta version

1) **Load Data:** The first step is to load Data. At this link http://www.uimcimes.es/QModeling_help/html/load_data.html it is described how to proceed.

For the 2-tissue compartmental model case, the mask with the ROIs must contain one ROI for the plasma activity data (*reference region*) and one or more ROIs representing specific-uptake areas for the preprocessing step (*region of interest*)

2) **Preprocessing:** Once the “2TCM: Two-tissue compartmental model” option is selected from the dropdown list, a new window will be opened in order to configure the preprocessing step.

Here, it is possible to load the TAC of whole blood activity for spillover correction (see Figure 1).

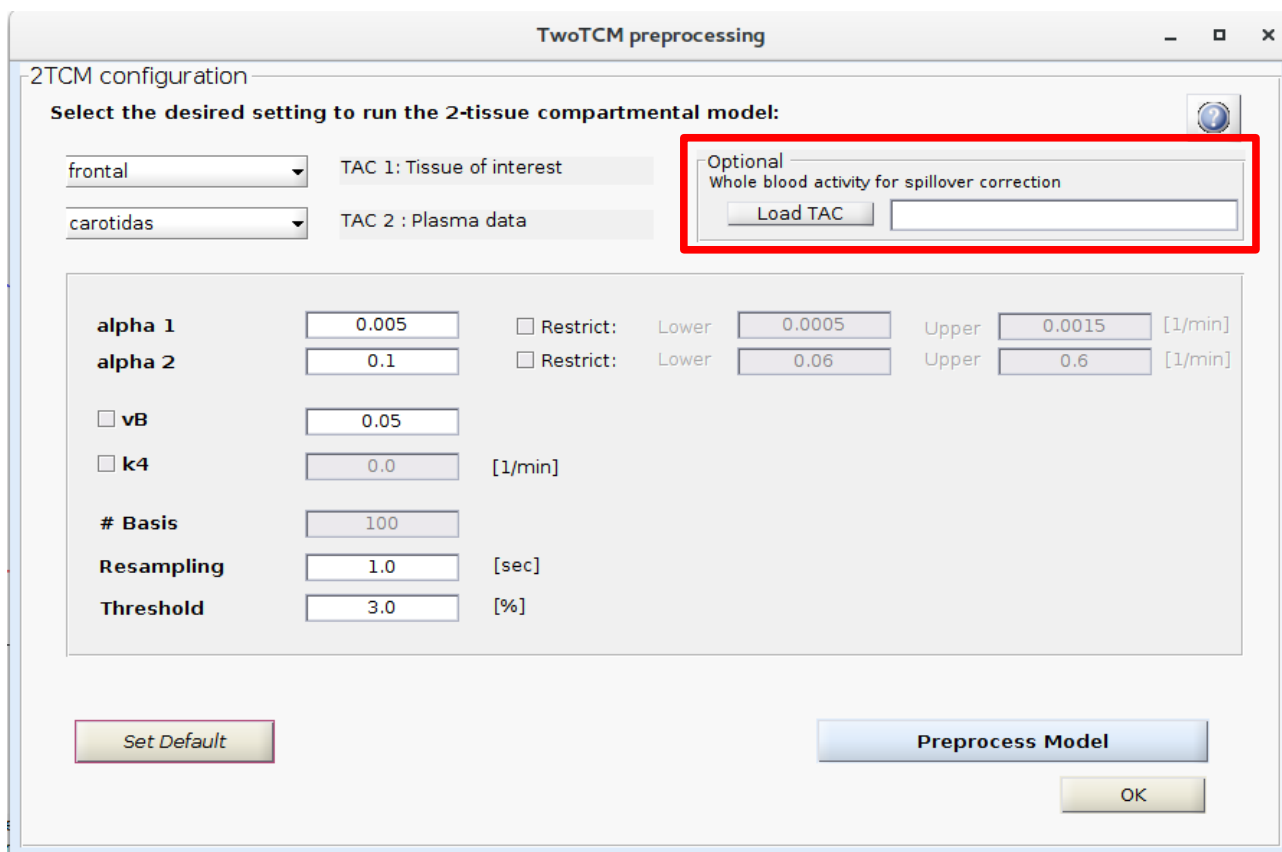


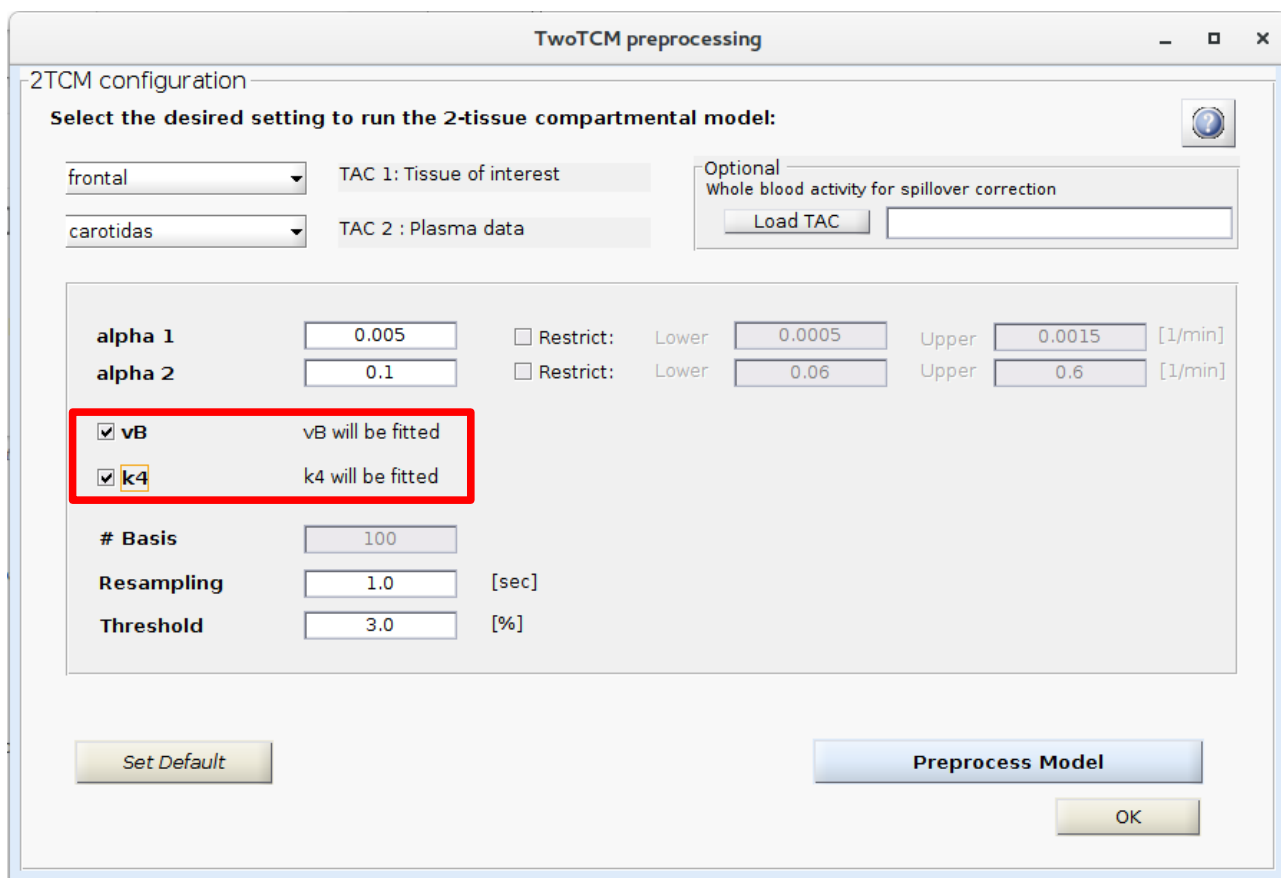
Figure 1

By default, the showed values for *alpha 1*, *alpha 2*, *vB* and *k4* parameters will be used. If we want to fit *vB* or *k4*, just click on the corresponding checkbox (see Figure 2)

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Instead of fix *alpha 1* or *alpha 2*, a logarithmic range for this two parameters could be obtain selecting the *Restrict* checkboxes. The number of elements of each range will depend on the number of basis functions, *# Basis* (see Figure 3).

The *Resampling* and *Threshold* parameters have the same functionality as in the SRTM model. Thus, more information about these parameters can be found at http://www.uimcimes.es/QModeling_help/html/help_SRTM.html#4



TwoTCM preprocessing

2TCM configuration

Select the desired setting to run the 2-tissue compartmental model:

frontal TAC 1: Tissue of interest Optional Whole blood activity for spillover correction

carotidas TAC 2: Plasma data Load TAC

alpha 1 0.005 Restrict: Lower 0.0005 Upper 0.0015 [1/min]

alpha 2 0.1 Restrict: Lower 0.06 Upper 0.6 [1/min]

vB vB will be fitted

k4 k4 will be fitted

Basis 100

Resampling 1.0 [sec]

Threshold 3.0 [%]

Set Default Preprocess Model OK

Figure 2

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TwoTCM preprocessing

2TCM configuration

Select the desired setting to run the 2-tissue compartmental model:

frontal ▼

carotidas ▼

TAC 1: Tissue of interest

TAC 2 : Plasma data

Optional
Whole blood activity for spillover correction

Load TAC

alpha 1

alpha 2

vB vB will be fitted

k4 [1/min]

Basis

Resampling [sec]

Threshold [%]

Restrict: Lower Upper [1/min]

Restrict: Lower Upper [1/min]

Figure 3

Clicking the *Preprocess Model* button, the model will be fitted to the data and the fitted parameters will be shown along with the fitted TAC (see Figure 4)

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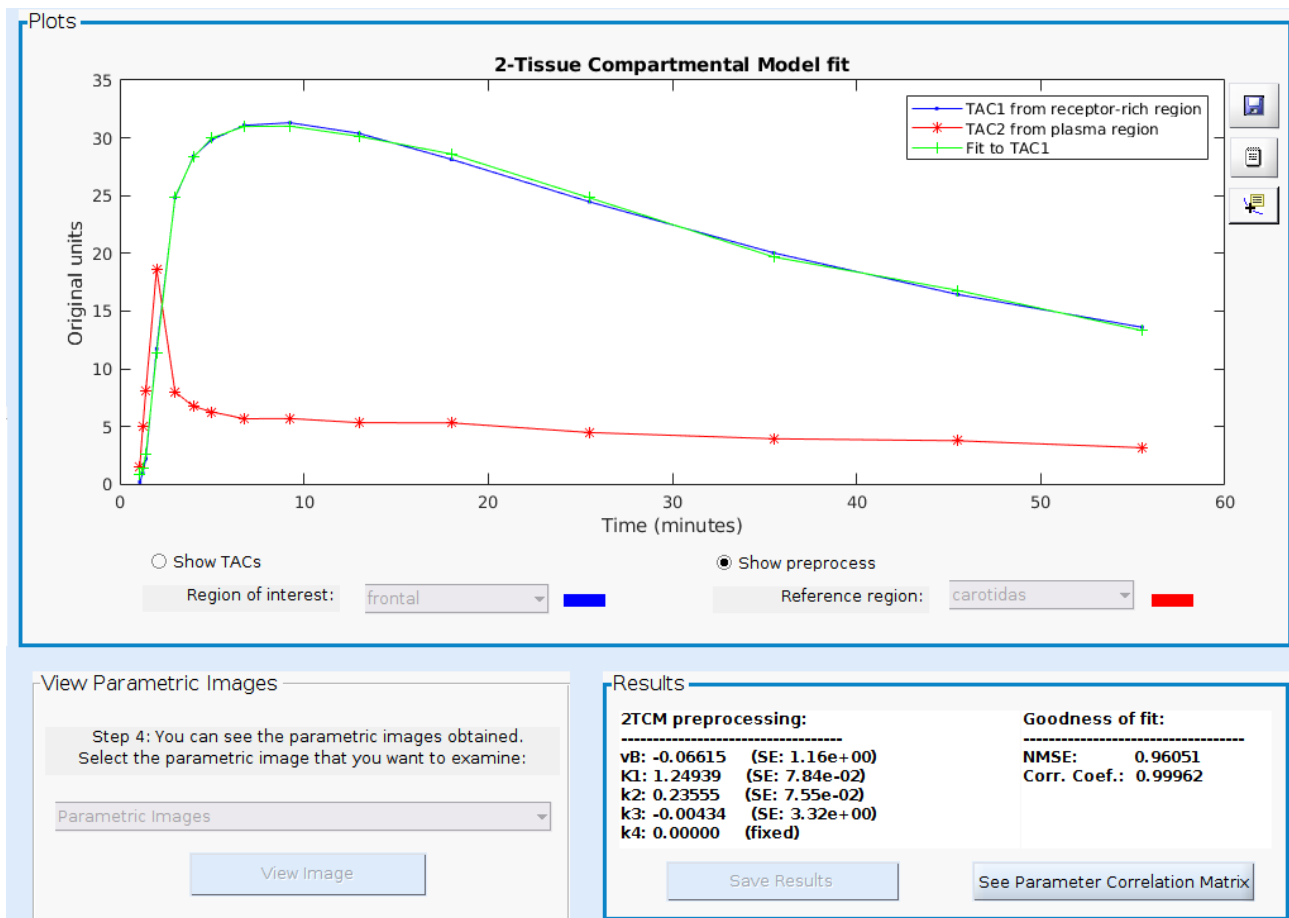


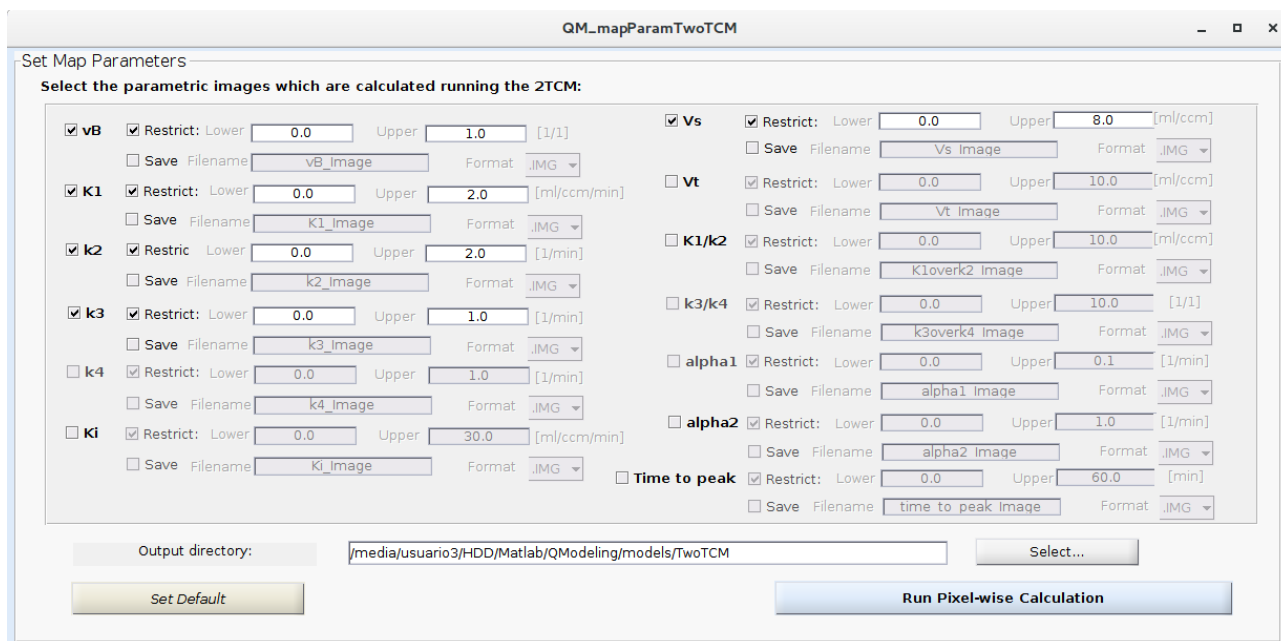
Figure 4

4) **Pixel-wise calculation:** To obtain the parametric images, from the preprocessing step, push the *Set Map Parameters* button. In the Figure 5 it is shown the new window will be opened.

In this new window, you can select the images you can obtain and save. More general information at http://www.uimcimes.es/QModeling_help/html/pixel_calculation.html

If the k_4 parameter was fixed to 0 at the preprocessing step, the images related to this parameter can not be calculated, that is, their checkbox will be disabled as we can see in Figure 5.

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The screenshot shows the 'QM_mapParamTwoTCM' window with the following settings:

- Set Map Parameters**
- Select the parametric images which are calculated running the 2TCM:**
 - vB** Restrict: Lower Upper [1/1]
 - Save Filename: Format: .IMG
 - K1** Restrict: Lower Upper [ml/ccm/min]
 - Save Filename: Format: .IMG
 - k2** Restrict: Lower Upper [1/min]
 - Save Filename: Format: .IMG
 - k3** Restrict: Lower Upper [1/min]
 - Save Filename: Format: .IMG
 - k4** Restrict: Lower Upper [1/min]
 - Save Filename: Format: .IMG
 - Ki** Restrict: Lower Upper [ml/ccm/min]
 - Save Filename: Format: .IMG
 - Vs** Restrict: Lower Upper [ml/ccm]
 - Save Filename: Format: .IMG
 - Vt** Restrict: Lower Upper [ml/ccm]
 - Save Filename: Format: .IMG
 - K1/k2** Restrict: Lower Upper [ml/ccm]
 - Save Filename: Format: .IMG
 - k3/k4** Restrict: Lower Upper [1/1]
 - Save Filename: Format: .IMG
 - alpha1** Restrict: Lower Upper [1/min]
 - Save Filename: Format: .IMG
 - alpha2** Restrict: Lower Upper [1/min]
 - Save Filename: Format: .IMG
 - Time to peak** Restrict: Lower Upper [min]
 - Save Filename: Format: .IMG

Output directory:

Figure 5

5) **View parametric images:** Go to http://www.uimcimes.es/QModeling_help/html/view_images.html