Tutorial using the new Minid and BDBag systems with PeptideAtlas and the Trans-Proteomic Pipeline

*Updated: 2017-10-31 - Eric Deutsch*

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**0) Before you begin**

This tutorial assumes that you already have *Trans-Proteomic Pipeline* (TPP) 5.1.0 or later installed on your Microsoft Windows system (tested with Windows 7 Pro 64-bit). If that is not the case, install that first by downloading and following the instructions at <http://tools.proteomecenter.org/wiki/index.php?title=TPP:5.1_Installation>. If you have a different kind of operating system, this tutorial should all still work, but the details of the installation will be somewhat different.

**Make sure that you are connected to the Internet for this tutorial!**

**1) Test the FetchDataset system and check dependencies**

* Open the *Petunia* TPP Graphical User Interface (TPP GUI) and login
* Under the [**TPP Tools**] menu, click [**Fetch Datasets**] near the bottom of the [**Utilities**] column
* Click on **[Show version information and available features]**
* Check to see if *Python*, *Minids*, and *BDBags* are all supported and available. If you already have these packages on your system, then you can proceed to step 5
* If not, install them as described in steps 2-4 below

**2) Install Python**

* Any version of Python 2 or 3 is probably fine, but we recommend and assume Python **3.6.x**
* Note that it is important how you install Python. If you only install it for your user, then the *Petunia* interface will not be able to see it and use it. It must be installed for all users.
* For Windows, go to <https://www.python.org/downloads/> and download python 3.6.x (as of this writing, click on the large yellow button [Download Python 3.6.3] although that may change.)
* Run the downloaded Python installer *python-3.6.x.exe*
* Check the option “**Add Python 3.6 to PATH**” at the very bottom of the first window
* Then click the [**Customize Installation**] option
  + All options should be checked, click [**Next**]
* Check option [**Install for all users**]. This may require administrator password but is required
* Click [**Install**]
* After installation there may be an option to increase the command line length beyond MAX\_LIMIT. We encourage you to perform this extra action, although it is not necessary for this tutorial.
* If there are installation errors, resolve these before proceeding.
* Make sure you can type this on the command-line (to open a cmd window, click the Windows button, and type **cmd** in the search box and hit [**ENTER**])
  + python --version

and get a result similar to: *python 3.6.3*

* You will need to reboot or restart the *TPP Apache Web Service* for the changes to PATH to be applied to the web server, which the TPP GUI system uses. If you don’t do this, TPP GUI won’t find *Python*.

**3) Install Minid software**

* Go to: <https://github.com/ini-bdds/minid>
* Click the green [**Clone or download**] button
* Choose [**Download ZIP**] and save file
* Open the *Downloads* folder, right-click on the *minid-master.zip* file and choose [**Extract All…**]
* Open a *cmd* window running as Administrator and install the python module.
  + To open a cmd window as Administrator, click the Windows button, and type **cmd** in the search box (but don’t hit [Enter]). When cmd.exe is found and listed in the search results, **right click** and select ‘**Run as Administrator**’. This will allow you to write to the system Python library directories:
  + cd \Users\yourname\Downloads\minid-master\minid-master (or wherever the extract appeared)
  + python setup.py install
* Review the installation message and if there are any errors, resolve before proceeding

**4) Install BDBag software**

* Go to: <https://github.com/ini-bdds/bdbag>
* Click the green [**Clone or download**] button
* Choose [**Download ZIP**] and save file
* Open the *Downloads* folder, right-click on the *bdbag-master.zip* file and choose [**Extract All…**]
* Open a *cmd* window running as Administrator (as above) and install the python module:
  + cd \Users\yourname\Downloads\bdbag-master\bdbag-master (or wherever extract appeared)
  + python setup.py install
* Review the installation message and if there are any errors, resolve before proceeding

**5) Check the fetchDataset system and dependencies**

* Open the *Petunia* interface and login
* Under [**TPP Tools**] menu, select [**Fetch Datasets**] near the bottom of the [**Utilities**] column
* Click on **[Show version information and available features]**
* You should see that *Python*, *Minids*, and *BDBags* are all supported and available
* If not, resolve any errors before proceeding or retry the above steps
* You should also see that the *fetchDataset* version installed matches the latest available
* If not (i.e. your version of *fetchDataset* is older than the latest), you should update to the latest before proceeding by clicking on the **[Update to the latest version of fetchDataset]** link at the bottom of the INFO box.
* When all your software and dependencies are up-to-date, then processed to step 6

**6) Find a dataset**

* Go to the Human Plasma PeptideAtlas data repository at:

<http://www.peptideatlas.org/hupo/hppp/repository/>

* Find the data from the recent Vogt et al. article. In the Search box at the top, type in “**vogt**” and [**Enter**]
* The HCD data are probably better, so try the first one, the *PAe005719*
* Expand it by clicking on **[+]** next to *PAe005719*
* Notice that the data are available via *Minids* for this dataset. Let’s choose to download just the end product, the “**Proteins**” *BDBag* which has an **ark:/57799/b96q2x**
* Click the little clipboard icon next to **ark:/57799/b96q2x** to copy it to the Windows clipboard
* Notice the accessible information for *Minids* and *BDBags*. Click on “What’s a Minid?”

**7) Download the dataset in TPP**

* Open the *Petunia* interface and login
* First, let’s create a place to put the dataset
  + Click on [**Files**] from the main menu
  + In the lower right text box right below [**Create a new directory**], type in “**PublicDatasets**” (no spaces and without the quotation marks), and then click on [**Create a new directory**]
  + Click on the newly created folder **PublicDatasets**
  + In the lower right text box right below [**Create a new directory**], type in “**PAe005719**” (no spaces and without the quotation marks), and then click on [**Create a new directory**]
* Now let’s download the data to there
  + Under [**TPP Tools**] menu, select [**Fetch Datasets**] near the bottom of the [**Utilities**] column
  + Choose a target directory by clicking [**Add Files**]
  + Navigate into **PublicDatasets** and check the **PAe005719** item and click [**Select**]
  + In the SPECIFY DATASET ID section, paste in the *Minid*: **ark:/57799/b96q2x**

(this *Minid* should be in your clipboard from step 6, so just paste with *CTRL+v*)

* + Check the option to **purge all contents** of the destination folder
  + This “final results” *BDBag* is quite small at only 74 MB in order to make this a speedy tutorial. Selecting other *BDBags* may incur substantially longer download times.
  + Click [**Fetch Dataset**]
* Let the process run and examine the output carefully for any errors
* If there are errors, resolve before proceeding

**8) Examine the dataset**

* Click on [**Files**] from the main menu
* Navigate to **PublicDatasets/PAe005719** folder
* Click on the [**ProtXML**] link to view the proteins detected
  + See protein list
  + Click on the **21** in the first column, next to **group #2**. See the mapping of peptides across the members of the group
  + Click on a protein **NX\_P35579-2** to explore peptide mappings for isoform 2 of Human Myosin-9
  + The dataset may be explored further as desired

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