

# Computation of Standardized Uptake Value (SUV) Images

Where can necessary information be found?

Using Matlab

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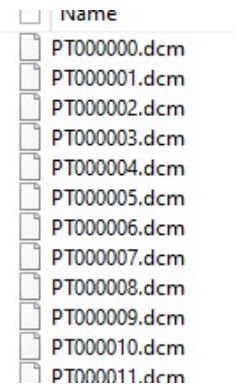
[18F]FDG-PET WORKSHOP – Second edition

Assessing Brain Glucose Metabolism  
in Patients with Disorders of Consciousness  
*from acquisition to interpretation*

📅 4.02.2026 🖥️ Virtual ➡️ Free registration

# Find the data

- Use the *cd* command or navigate from the Matlab *Current Folder* windows
- The images are all together in a folder, they are saved slice by slice.
- When you open the folder, you'll find a collection of file.



# Extract the dicom information

- In the Command Window type  
`Info=dicominfo('PT000000.dcm')`

This will put all the information in the info variable. It will help to retrieve the necessary data.

```
>> dicominfo('PT000000.dcm')
ans =
  struct with fields:
    Filename: 'D:\Document-D\MATLAB\Cerveau\FDGPET_DAVID_BOWIE\PTCT_Brain\PT Brain
    FileModDate: '08-sept.-2021 16:43:55'
    FileSize: 48688
    Format: 'DICOM'
    FormatVersion: 3
    Width: 128
    Height: 128
    BitDepth: 16
    ColorType: 'grayscale'
    FileMetaInformationGroupLength: 222
    FileMetaInformationVersion: [2x1 uint8]
    MediaStorageSOPClassUID: '1.2.840.10008.5.1.4.1.1.128'
    MediaStorageSOPInstanceUID: '1.3.46.670589.28.2.15.30.26391.63333.3.2192.0.1593093645'
    TransferSyntaxUID: '1.2.840.10008.1.2.1'
    ImplementationClassUID: '1.2.276.0.7230010.3.0.3.6.4'
    ImplementationVersionName: 'OFFIS_DCMTK_364'
    SourceApplicationEntityTitle: 'DicomBrowser'
    SpecificCharacterSet: 'ISO_IR 100'
    ImageType: 'ORIGINAL\PRIMARY'
    InstanceCreationDate: '20200101'
    InstanceCreationTime: '154332'
    SOPClassUID: '1.2.840.10008.5.1.4.1.1.128'
    SOPInstanceUID: '1.3.46.670589.28.2.15.30.26391.63333.3.2192.0.1593093645'
    StudyDate: '20200101'
    SeriesDate: '20200101'
    AcquisitionDate: '20200101'
    ContentDate: '20200101'
    AcquisitionDateTime: '20200101154751'
    StudyTime: '154703'
    SeriesTime: '154706'
    AcquisitionTime: '154751'
```

## Formula used

- $SUV = \frac{Uptake [Bq/ml]}{A_{inj}[Bq]} \cdot Weight[g] \quad [g/ml]$

- $A_t = A_0 \cdot e^{-0,693 \cdot \frac{\Delta t}{T}}$  gives the activity at the time  $\Delta t$  after it has been measured at  $A_0$  (to take into account the natural radioactive decay)

# Extract the information from data

- Use `dicominfo` to access the DICOM information of the header.
  - Navigate to the directory that contains the dicom image of the patient.
  - Copy the information into a variable (for example `info`) to be able to use them later
  - `Info = dicominfo(" PT000000.dcm ")`
- Weight : `w= info.PatientWeight *1000` . For SUV calculation, you need the weight in g; the dicom header contains the weight express in kg.
- Activity (in Bq) at time of measurement
  - `A0= info.RadiopharmaceuticalInformationSequence.Item_1.RadionuclideTotalDose`
- Time of measurement (time when the activity was assessed)
  - `Tm = info.RadiopharmaceuticalInformationSequence.Item_1.RadiopharmaceuticalStartTime`
- Time of acquisition : Here you must be carrefull. Be sure the slice you selected is the FIRST one acquired. In doubt use the `SeriesTime` instead of the acquisition time. The difference should not be big, just some seconds except for dynamics scan.
  - `Ta=info.AcquisitionTime` or `Ta=info.SeriesTime`.
- Half live (unit is s in the dicom. This formulation is in min)
  - `T= info.RadiopharmaceuticalInformationSequence.Item_1.RadionuclideHalfLife / 60`

# Extract the information from data

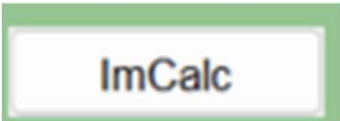
- Delay (in s) :  
Ta and Tm are given as string. We need matlab commands to translate the string into numbers (str2num)

$$DT = \text{str2num}(Ta(1:2))*3600 + \text{str2num}(Ta(3:4))*60 + \text{str2num}(Ta(5:6)) \\ - \text{str2num}(Tm(1:2))*3600 - \text{str2num}(Tm(3:4))*60 - \text{str2num}(Tm(5:6))$$

$DT = DT/60$  to have the delay in min instead of s. You can also calculate the delay « by hand » and use it

- Activity at time of acquisition  
 $A = A0 * \exp((-0.693) * DT/T)$
- Factor used to multiply the image in SPM-PET → imcalc  
 $F = w/A$

You can copy paste this value into the batch imCalc from spm.



Batch Editor

File Edit View SPM BasicIO

Module List

- Image Calculator

Current Module: Image Calculator

Help on: Image Calculator

Input Images ...PET\_PATIENT1\s00000000-936450-00001-000001.nii,1

Output Filename output SUV

Output Directory

Expression **i1\*F**

Additional Variables

Options

- . Data matrix No - don't read images into data matrix
- . Masking No implicit zero mask
- . Interpolation Trilinear
- . Data Type INT16 - signed short

Current Item: Expression

**i1\*F**

Specify...

Expression

Example expressions:

- \* Mean of six images (select six images)  
``(i1+i2+i3+i4+i5+i6)/6``