

# Precision medicine: NGS variant analysis and interpretation for translational research

## Exercise 2: Variant annotation with VEP

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# Study case

**Tumor type: hepatic met – colon adenocarcinoma**

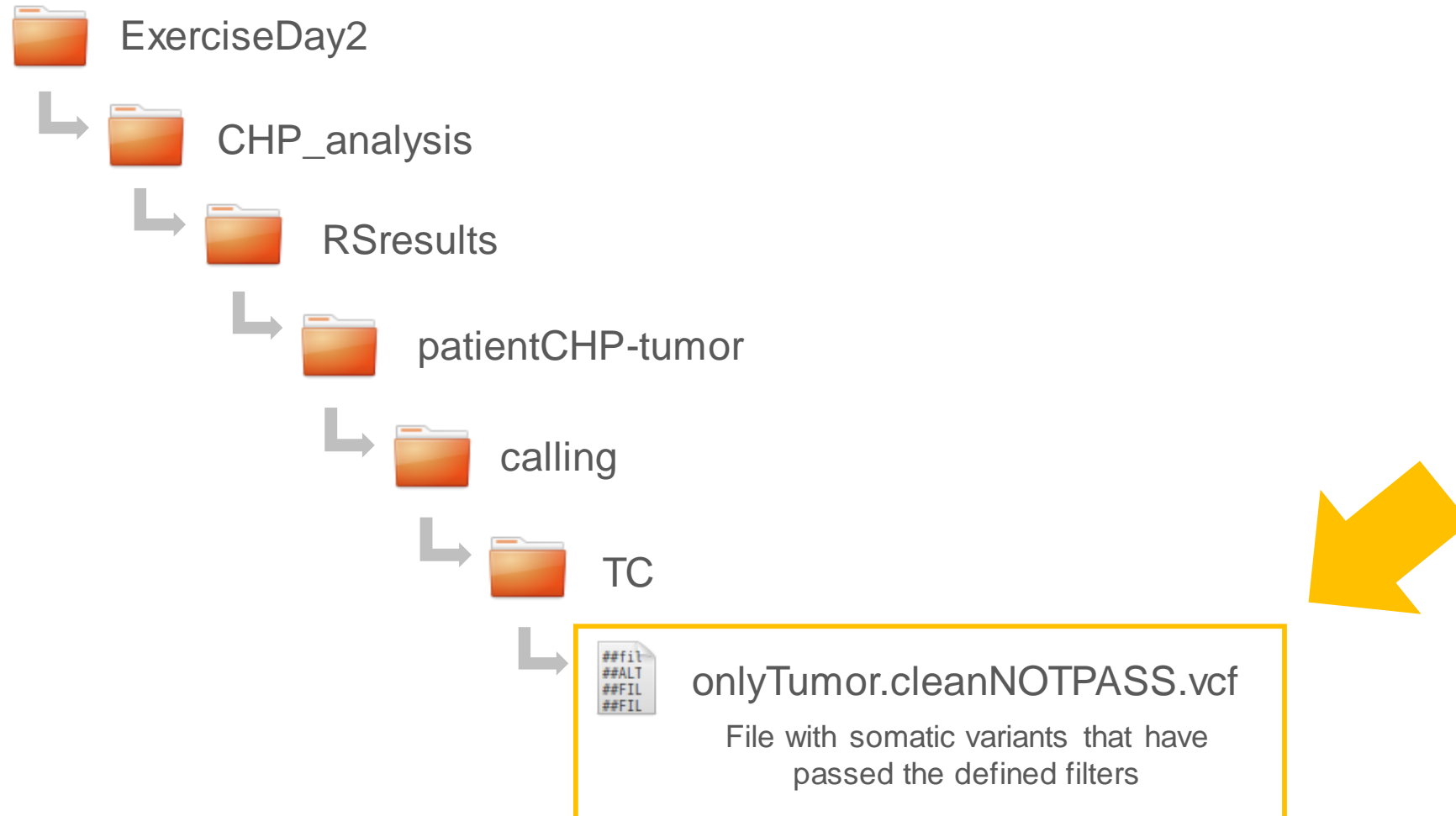
Sequencing: Ion Torrent technology

Panel: Ion Ampliseq Cancer Hotspot Panel v2

Tumor – control paired sample

File with somatic variants: variants detected in tumor sample but not in the corresponding control

# Path to the input file



# Execute of VEP through the web page

- We want to obtain the using the ensembl transcript set
  - We want in the output the following annotations:
    - HUGO gene symbol
    - The HGVS identifiers for cDNA and protein
    - The Global Minor Allele Frequency of 1000 genomes project
    - ExAC frequencies
    - SIFT and PolyPhen prediction and score
    - Condel prediction and score
  - You can choose any other parameters to explore the results
- HINTS: Remember the assembly used in the variant detection  
<http://www.ensembl.org/info/docs/tools/vep/online/input.html> (further info)

# Answer the following questions

How many variants were in the input file?

How many of them are not known in the data base?

How many genes and transcripts are affected by the variants?

Is there any regulatory region overlapping some variant?

Which is the most represented consequence category?

Which is the most represented coding sequence?

# Answer the following questions

How many variants fall in a coding region in some gene?

What does the HGVS identifiers mean in each case?

Does the prediction tool agree in the prediction of functional impact?

Is there any clear polymorphism within the data?

... and explore the results

# Download the file

Save the file in vcf format, copy it in the CHP\_analysis folder and rename it (e.g. patientCHP.onlyTumor.cleanNOTPASS.vcf)

Check that the following fields has been added to the INFO field:

- |                      |                     |
|----------------------|---------------------|
| - Consequence        | - HGVS <sub>p</sub> |
| - Existing_variation | - GMAF              |
| - Feature            | - CDS_position      |
| - PolyPhen           | - Allele            |
| - Condel             | - Gene              |
| - SIFT               | - Feature_type      |
| - SYMBOL             | - cDNA_position     |
| - Protein_position   | - Codons            |
| - Amino_acids        | - ExAC_Adj_MAF      |
| - HGVSc              | - ExAC_NFE_MAF      |