



# PharmGKB Training Exercise – Neurology

## How to use this exercise

This exercise is intended to help new users familiarize themselves with the PharmGKB website and some of the different types of information available. **This exercise is not for use in a classroom setting for credit**, including professional development such as CME, as the answer sheet is freely available on the PharmGKB website.

We recommend that the trainer first provide an introduction to the PharmGKB website and its key features, including the genotype pickers available for the CPIC dosing guidelines. This exercise can then be used to reinforce areas covered in the introduction.

The ‘What is PharmGKB?’ page at [www.pharmgkb.org/whatIsPharmgkb](http://www.pharmgkb.org/whatIsPharmgkb) has helpful explanations of the different types of information that can be accessed on the PharmGKB website. This page will be useful for any trainers who are themselves unfamiliar with the PharmGKB website.

This exercise should take about 20-30 minutes to complete following an introduction to the website.

During the training session, each person will require access to an internet-connected computer where they can access the PharmGKB website.

An answer sheet for this exercise is provided at the end of this document.

PharmGKB is for research purposes only and does not provide medical advice or recommend when to order a pharmacogenetic test. All questions are written under the assumption that a patient’s genetic information is already available.

If you have any questions or comments regarding this training exercise, please contact the PharmGKB team at [feedback@pharmgkb.org](mailto:feedback@pharmgkb.org)



# PharmGKB Training Exercise – Neurology

A pediatric patient has been diagnosed with epilepsy which you want to treat by prescribing one of four different antiepileptics; carbamazepine, clonazepam, oxcarbazepine or phenytoin.

Looking through the patient's medical records, you notice that they have been genotyped and want to see if there's any information which might help you decide which drug to prescribe.

1) Are there any Level 1 clinical annotations associated with the four drugs on the PharmGKB website? (Note - for the purpose of this portion of the exercise, we will focus only on Level 1 annotations).

2) Which genes should you check before making a prescribing decision?

Below are the patient's genotypes at the relevant genes:

Gene	Genotype/Diplotype
CYP2C9	*2/*3
HLA-A	*02:07:01/*31:01:02
HLA-B	*27:02:01/*40:01:01

3) What is the patient's CYP2C9 metabolizer phenotype (Hint – use the annotations of the CPIC or DPWG guidelines for phenytoin to help)?

4) Could you prescribe carbamazepine to this patient? Why?

5) Could you prescribe clonazepam to this patient? Why?

6) Could you prescribe oxcarbazepine to this patient? Why?

7) Could you prescribe phenytoin to this patient? Why?

A pediatric patient has been diagnosed with epilepsy which you want to treat by prescribing one of four different antiepileptics; carbamazepine, clonazepam, oxcarbazepine or phenytoin.

Looking through the patient's medical records, you notice that they have been genotyped and want to see if there's any information which might help you decide which drug to prescribe.

1) Are there any Level 1 clinical annotations associated with the four drugs on the PharmGKB website? Which genes should you check before you make a prescribing decision? (Note - for this portion of the exercise of this exercise, we will focus only on Level 1 annotations).

Yes – One for HLA-A and carbamazepine, one for HLA-B and carbamazepine, nothing for clonazepam, one for HLA-B and oxcarbazepine, two for CYP2C9 and phenytoin and one for HLA-B and phenytoin.

2) Which genes should you check before making a prescribing decision?

HLA-A, HLA-B and CYP2C9

Below are the patient's genotypes at the relevant genes:

Gene	Genotype/Diplotype
CYP2C9	*2/*3
HLA-A	*02:07:01/*31:01:02
HLA-B	*27:02:01/*40:01:01

3) What is the patient's CYP2C9 metabolizer phenotype (Hint – use the annotations of the CPIC or DPWG guidelines for phenytoin to help)? **Poor metabolizer**

4) Could you prescribe carbamazepine to this patient? Why? **No. Patient is at an increased risk of experiencing cutaneous adverse reactions such as Stevens-Johnson syndrome (SJS) and toxic epidermal necrolysis (TEN).**

5) Could you prescribe clonazepam to this patient? Why? **Yes. There are no clinical annotations that suggest that a genetic variant might affect a patient's response to clonazepam.**

6) Could you prescribe oxcarbazepine to this patient? Why? **Yes. Patient is not carrying the HLA-B\*15:02:01 allele.**

7) Could you prescribe phenytoin to this patient? Why? **Yes, but at a reduced dose. Patient will have reduced metabolism of phenytoin and is at an increased risk of experiencing drug toxicity.**