Case 2
Case 2

Ankit is a 17-year-old patient who was rock climbing earlier in the day. After a slip during the climbing session, he lost his balance and fell approximately 15 feet landing on his right arm. His friend drove him to the emergency room.

During his clinical evaluation, Ankit reports no injury to the head during the fall. An x-ray shows a broken radius (oblique displaced fracture). No tissue injury is evident and all other clinical measures are normal.

Ankit needs a medication for his pain.
Case 2

• The prescriber is considering treating the pain with: 
  
  **Codeine**

• Question 1: How does this drug work to treat pain?  
  *Hint: pharmacodynamics; use* [https://www.pharmgkb.org/annotatedDrugs](https://www.pharmgkb.org/annotatedDrugs)
Case 2

- Metabolism of codeine

Codeine $\xrightarrow{\text{Liver}}$ Morphine (more active) $\xrightarrow{\text{Provide pain relief}}$

- Key pharmacogene for codeine: $CYP2D6$
Case 2

- You recommend preemptive testing of Ankit’s CYP2D6 genotype before initiating therapy with codeine. In the meantime, you have the genotypes of Ankit’s parents in the electronic medical records.

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<thead>
<tr>
<th></th>
<th>Dad</th>
<th>Mom</th>
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<tbody>
<tr>
<td></td>
<td>*3/*1x2</td>
<td>*1/*5</td>
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Case 2

• Question 2: What genotypes and phenotypes are possible for Ankit based on mom and dad’s genotype?

<table>
<thead>
<tr>
<th>Possible Genotypes (*X/*X)</th>
<th>Phenotype (Poor/Normal/Intermediate/Ultrarapid Metabolizer)</th>
<th>Drug Therapy Recommendation (Use/Don’t Use/Change Dose)</th>
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Use This Website To Look Up Genotype-Based Dosing:
https://www.pharmgkb.org/chemical/PA449088/guidelineAnnotation/PA166104996
Case 2

- Ankit underwent rapid genotyping in the emergency room and you have received the results.

  **CYP2D6: *1 x 2/*1**

- Question 3: What is Ankit’s phenotype?

- Question 4: What do you recommend for their treatment? Why (better or worse benefit/toxicity)?