

**Module 41 Practice FRQ**

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.



0	1
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The response indicates that the most likely cause is a random mutation. (However, differential gene activation in some organisms under different environmental conditions is also possible.)

**Part A (ii)**

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.



0	1
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The response indicates that each increasing concentration of artesunate selected for only those members of the artesunate-sensitive *Plasmodium* population that could survive and reproduce, and eventually only artesunate-resistant organisms remained to reproduce.

**Part B (i)**

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.



0	1	2	3
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The sketched bars meet all of the criteria below.

- Correct axis labeling
- Correct scale and unit
- Correctly plotted bar graph

The y-axis should be labeled  $IC_{50}$  (nM). The x-axis should be labeled "Drug."

**Part B (ii)**

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.



0	1
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The response indicates that amodiaquine, DHA, and quinine have significantly higher IC<sub>50</sub>s for ART-R than for ART-S and are therefore likely to be less effective at treating disease caused by ART-R than by ART-S.

**Part C (i)**

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.



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The response indicates that the drug that, from the ART-S strain to the ART-R strain, has the largest relative increase in the IC<sub>50</sub> is amodiaquine.

**Part C (ii)**

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.



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The response indicates that the *in vivo* artesunate sensitivity of the ART-R *Plasmodium* strain in comparison with the original ART-S strain has decreased by 1,600 times  $240/0.15 = 1,600$ ).

**Part D (i)**

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.



0	1
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The response indicates that a mutation had occurred to the gene encoding the *Plasmodium* ligand so that the protein changed its conformation and specificity.

**Part D (ii)**

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.



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The response indicates that if the *Plasmodium* organisms infecting the two different types of cells can no longer successfully interbreed and produce offspring that can undergo successful sexual reproduction, then the *Plasmodium* has

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evolved into two separate species.