**AP DNA Comparison**

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| 1 | G | G | T | C | A | C | G | C | T | G | G | T | A | A | C | C | A | T | G | G | G | G | A | A | G | A | T | G | A | A | T | T | G | A | A | G | C | C | A | T | G | G | G | A | C | A | C | A | G | G | A | A | A | T | C | C | A | A | T | T |
| 2 | G | G | T | C | A | C | G | C | T | G | G | C | A | A | C | C | A | T | G | T | G | G | A | A | G | A | T | G | A | A | T | T | G | A | A | G | A | A | A | T | G | G | G | A | C | A | C | A | G | G | G | A | A | T | C | C | A | A | A | T |
| 3 | G | G | T | C | A | C | G | C | T | G | G | C | A | A | C | C | A | T | G | T | G | G | A | A | G | A | T | G | A | A | T | T | G | A | A | G | A | A | A | T | G | G | G | A | C | A | C | A | G | G | G | A | A | T | C | C | A | A | A | T |
| 4 | G | G | T | C | A | C | G | C | T | G | G | T | A | A | C | C | A | T | G | G | G | G | A | A | G | A | T | G | G | A | T | T | G | A | A | G | C | C | A | T | G | G | G | A | C | A | C | A | G | G | A | A | A | T | C | C | A | A | T | T |

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| 1 | C | A | A | T | T | T | C | G | G | A | C | C | T | G | T | G | A | C | A | G | C | C | C | A | A | A | G | C | A | T | A | G | G | G | A | A | T | A | G | T | T | G | G | T | C | A | A | C | C | T | A | T | T | A | G | T | T | T | A | A |
| 2 | C | A | C | T | T | T | G | G | G | A | C | C | T | G | T | G | A | C | A | G | T | C | C | A | A | A | G | C | A | A | A | G | G | G | A | A | T | A | G | T | T | G | G | T | C | A | C | C | C | T | A | T | T | A | G | A | T | T | A | G |
| 3 | C | A | C | T | T | T | G | G | G | A | C | C | T | G | T | G | A | C | A | G | T | C | C | A | A | A | G | C | A | A | A | G | G | G | A | A | T | A | G | T | T | G | G | T | C | A | C | C | C | T | A | T | T | A | G | A | T | T | A | G |
| 4 | C | A | A | T | A | T | C | G | G | A | C | C | T | G | T | G | A | C | A | G | A | C | C | A | A | A | G | C | A | T | A | G | G | G | A | A | T | A | G | T | T | G | G | T | C | A | A | C | C | T | A | T | T | A | G | T | T | T | A | A |

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| 1 | A | A | A | T | C | A | T | G | A | A | T | T | G | T | T | A | T | A | A | A | A | A | A | G | A | G | C | C | C | T | T | A | A | C | C | T | A | T | T | T | C | T | T | A | T | T | C | C | A | A | T | A | A | T | T | C | C | C | A | A |
| 2 | A | A | A | A | C | A | T | G | A | A | A | T | G | T | T | A | T | A | A | A | A | A | A | G | A | T | C | C | A | T | T | A | A | C | C | T | A | T | T | T | C | T | T | A | T | T | C | C | A | A | T | A | T | T | T | T | T | C | A | A |
| 3 | A | A | A | A | C | A | T | G | A | A | A | T | G | A | T | A | T | A | A | A | A | A | A | G | A | T | C | C | A | T | T | A | A | C | C | T | A | T | T | T | C | T | T | A | T | T | C | C | A | G | T | A | T | T | T | T | T | C | A | A |
| 4 | A | A | A | T | C | A | T | G | A | A | T | T | G | T | T | A | T | A | A | A | A | A | A | G | A | G | C | C | C | T | T | A | A | C | C | T | A | T | T | T | C | T | T | A | T | T | C | C | A | A | T | A | A | T | C | C | C | C | A | A |

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| 1 | A | T | T | T | G | T | A | C | T | A | A | C | T | G | C | C | A | A | C | C | T | T | C | A | T | C | A | A | T | T | C | C | T | A | A | C | T | C | T | T | T | C | C | G | G | A | A | A | C | C | T | T | C | A | A | A | A | T | C | T |
| 2 | T | T | T | T | G | T | A | C | T | A | T | C | T | G | C | C | A | A | C | C | C | T | C | A | T | C | A | A | T | T | C | C | T | A | A | C | T | C | T | T | T | C | C | A | G | A | A | A | C | C | T | T | C | A | A | T | A | T | C | T |
| 3 | T | T | T | T | G | T | A | C | T | A | T | C | T | G | C | C | A | A | C | C | C | T | C | A | T | C | A | A | T | T | C | C | T | A | A | C | T | C | T | T | T | C | C | A | G | A | A | A | C | C | T | T | C | A | A | T | A | T | C | T |
| 4 | A | T | T | C | G | T | A | C | T | A | C | C | T | G | C | C | A | C | C | C | T | T | C | A | T | C | A | A | T | T | C | C | T | A | A | C | T | C | C | T | T | C | C | G | G | A | A | A | C | C | T | T | C | A | A | A | A | T | C | T |

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| 1 | A | A | T | T | G | C | T | T | C | G | A | T | T | T | C | T | C | C | T | A | G | G | C | T | C | A | C | T | T | A | G | C | A | T | C | T | T | T | C | C | T | C | A | T | T | T | T | A | T | T | T | C | C | T | C | A | A | T | C | T |
| 2 | A | A | A | T | G | C | T | T | C | C | A | T | T | T | C | T | C | C | T | A | G | T | C | T | C | A | C | A | T | A | G | C | A | T | C | C | T | C | C | C | T | C | A | T | C | T | T | A | T | T | T | C | C | T | C | A | T | T | C | T |
| 3 | A | A | A | T | G | C | T | T | C | C | A | T | T | T | C | T | C | C | T | A | G | T | C | T | C | A | C | A | T | A | G | C | A | T | C | C | T | C | C | C | T | C | A | T | C | T | T | A | T | T | T | C | C | T | C | A | T | T | C | T |
| 4 | A | A | C | T | G | C | T | T | C | G | A | T | T | T | C | T | C | C | T | A | G | G | C | T | C | A | C | T | T | A | G | C | A | T | C | T | T | T | C | C | T | C | A | T | T | T | A | A | T | T | T | C | C | T | C | A | A | T | C | C |

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| 1 | C | C | T | G | T | T | G | C | A | C | C | A | A | C | C | T | G | G | C | A | A | G | G | C | C | C | T | T | T | T | C | C | C | A | G | G | T | T | A | A | C | T | C | C | A | C | A | A | C | A | G | G | T | T | A | A | C | T | T | T |
| 2 | C | C | T | G | C | T | G | C | A | C | C | A | G | C | C | T | G | G | C | A | A | G | G | C | C | C | T | A | A | T | C | G | C | A | G | G | T | T | A | A | G | T | C | C | A | C | A | A | C | A | G | G | T | T | T | T | C | T | T | T |
| 3 | C | C | T | G | C | T | A | C | A | C | C | A | G | C | C | T | G | G | C | A | A | G | G | C | C | C | T | A | A | T | C | G | C | A | G | G | T | T | A | A | G | T | C | C | A | C | A | A | C | A | G | G | T | T | T | T | C | T | T | T |
| 4 | C | C | T | G | T | C | G | C | A | C | C | A | A | C | C | T | G | G | C | A | A | G | G | C | C | C | T | T | C | T | C | C | C | A | G | G | T | T | A | A | C | T | C | C | A | C | A | A | A | A | G | G | T | T | A | A | C | T | T | T |

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| 1 | C | T | T | C | C | T | A | T | C | C | A | A | A | T | A | T | T | A | T | T | T | T | C | C | G | C | T | A | C | C | C | T | C | T | T | T | A | A | A | C | A | T | G | A | A | C | C | T | G | A | T | T | A | G | T | A | C | C | T | T |
| 2 | C | T | T | A | C | T | A | T | C | C | T | A | A | A | A | T | T | A | T | T | T | T | C | C | T | C | T | A | C | C | C | T | C | T | T | T | T | T | A | C | A | T | G | A | A | C | C | T | G | A | T | T | A | G | T | A | T | C | T | T |
| 3 | C | T | T | A | C | T | A | T | C | C | T | A | A | A | A | T | T | A | T | T | T | T | C | C | T | C | T | A | C | C | C | T | C | T | T | T | T | T | G | C | A | T | G | A | A | C | C | T | G | A | T | T | A | G | T | A | T | C | T | T |
| 4 | C | T | T | C | C | T | T | T | C | C | A | A | A | T | T | T | T | A | T | T | T | T | C | C | G | C | T | A | C | C | C | T | T | T | T | T | A | A | A | C | A | T | G | A | A | C | C | T | G | A | T | T | A | C | T | A | C | C | T | T |

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| 1 | C | T | C | C | T | T | T | T | C | C | C | A | T | G | G | T | G | G | G | T | A | A | T | C | T | T | G | T | T | T | A | A | G | C | C | T | T | C | A | G | C | T | C | A | T | A | G | A | C | T | A | A | A | T | T | G | G | G | A | T |
| 2 | C | T | C | C | T | A | T | T | C | C | C | A | T | G | G | T | G | G | C | T | A | A | T | C | T | T | G | T | T | T | T | A | G | C | C | C | T | C | A | G | C | T | C | A | A | A | G | A | G | T | A | A | A | T | T | G | A | G | A | T |
| 3 | C | T | C | C | T | A | T | T | C | C | C | A | T | G | G | T | G | G | C | T | A | A | T | C | T | T | G | T | T | T | T | A | G | C | C | C | T | C | A | G | C | T | C | A | A | A | G | A | G | T | A | A | A | T | T | G | A | G | A | T |
| 4 | C | T | G | G | T | T | T | T | C | C | C | A | T | G | G | T | G | G | G | T | T | A | T | C | T | T | G | G | T | T | A | A | G | C | C | T | T | C | A | G | C | T | C | A | T | A | G | A | C | T | A | A | A | T | T | G | G | G | A | T |

**Adapted from:** NSTA. https://www.nsta.org/publications/press/extras/files/virus/Virus-Activity6.pdf

The chart represents one gene, but from four different organisms. The gene is much longer (over 1500 nucleotides!), so just the first 400 nucleotides of all four were provided. Compare the nucleotide sequences for the four genes of the four different organisms, and use that comparison to answer the following questions.

1. Based on the data, construct a cladogram of the four organisms.
2. Which two organisms are the most similar? What evidence do you have to support that claim?
3. What is the order of diversion? How do you know this?