

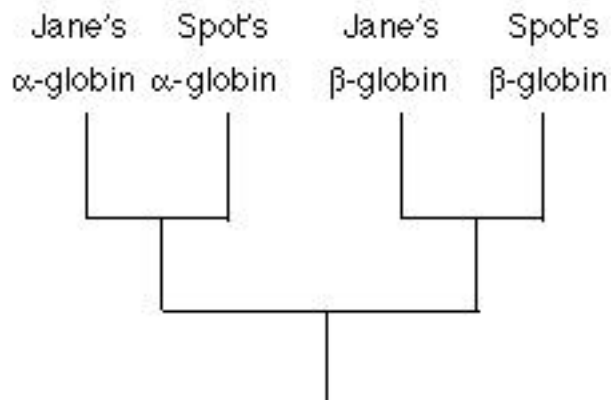
## EXERCISES FOR TUESDAY NOV. 26

Do the following at home. Bring the answers to class, in two copies; you'll hand one in so I can see that you really did them. We'll discuss the answers in class.

### 1. Rooting trees

Draw all the unrooted trees for 4 taxa. Then explain what you would have to do to draw all the rooted trees for 5 taxa.

2. Explain the structure of the following phylogeny of globin genes, which suggests that Jane's  $\alpha$ -globin gene is more closely related to her dog Spot's  $\alpha$ -globin gene than to her own  $\beta$ -globin gene, etc..



3. What is a gene family, and how do gene families arise?

4. Explain the structure of the following phylogeny of the small-subunit rRNA genes from the nucleus and chloroplast of maize and from the photosynthetic bacterium (cyanobacterium, "blue-green alga") *Anabaena*.

