

Assignment # 3 due Thursday, Jan 31

In humans there are two sex chromosomes: X and Y. Males are XY and females are XX. In chickens there are also two sex chromosomes: Z and W. Males are ZZ and females are ZW.

The question for this assignment is whether or not the human X chromosome is homologous to the chicken Z chromosome. We will answer this by using BLAST to align some human genes to the chicken genome and some chicken genes to the human genome (a more advanced study would include more genes than we are considering). If the genes on the human X chromosome map to the chicken Z chromosome (and vice versa), this supports the idea that the two species' sex determination system had a common origin. If instead the genes on the human X chromosome map to chromosomes other than the chicken Z chromosome (and vice versa), this supports the idea that the two sex determination systems evolved independently.

In Content, the file "somehuman.fa" has 7 human genes and the file "somechicken.fa" has 7 chicken genes (chromosomes labeled in both files). Use (protein) BLAST to align the human genes to the chicken genome (in "Choose Search Set" and "Organism" select "chicken (taxid:9031)"). Likewise, use (protein) BLAST to align the chicken genes to the human genome (in "Choose Search Set" and "Organism" select "human (taxid:9606)"). For each of the genes, follow the links for the best match to find the chromosome of the best match in the other species. This information is under "FEATURES" in (lower case) "source".

For each gene, write down the following information:

1. Gene name (human gene 1-7, chicken gene 1-7)
2. Chromosome number of gene
3. Chromosome number of best match in other species

Based on this information, do you think the human chromosome X and the chicken chromosome Z are homologous?

Human gene 1

- Chromosome 5
- Chicken chromosome Z

Human gene 2

- Chromosome 5
- Chicken chromosome Z

Human gene 3

- Chromosome 9
- Chicken chromosome Z

Human gene 4

- Chromosome 9
- Chicken chromosome Z

Human gene 5

- Chromosome X

- Chicken chromosome 1

Human gene 6

- Chromosome X
- Chicken chromosome 1

Human gene 7

- Chromosome X
- Chicken chromosome 4

Chicken gene 1

- Chromosome 1
- Human chromosome 22

Chicken gene 2

- Chromosome 1
- Human chromosome X

Chicken gene 3

- Chromosome 1
- Human chromosome X

Chicken gene 4

- Chromosome 4
- Human chromosome X

Chicken gene 5

- Chromosome Z
- Human chromosome 5

Chicken gene 6

- Chromosome Z
- Human chromosome 9

Chicken gene 7

- Chromosome Z
- Human chromosome 5

The human chromosome X and chicken chromosome Z do not seem to be homologous.