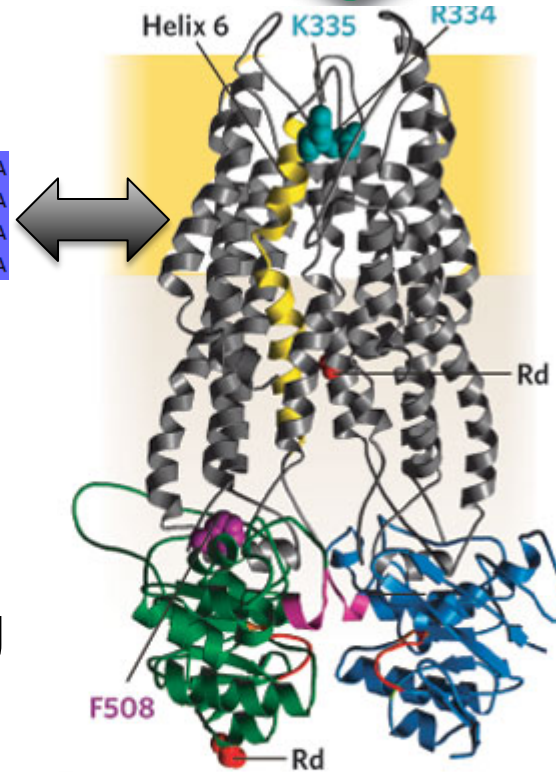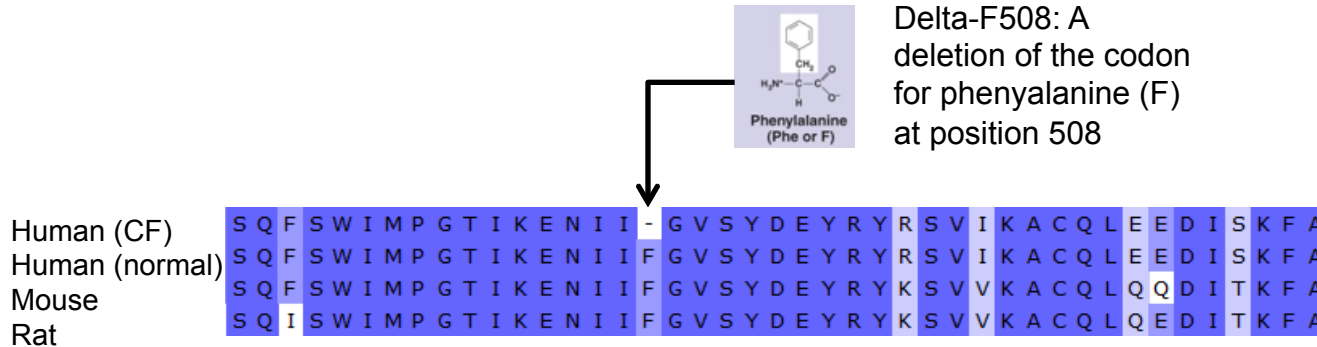# BIOL 2500K Bioinformatics I Database and Tools

- A project-based course

- Spring, 2013

- Lecture: MWF, 1 – 1:50PM (E-171)

- Lab: F, 2 – 4:50PM (E-171)

- Pre-requisite: BIOL 2107K

- Suggested Text:
  - Introduction to Bioinformatics
  - by Arthur Lesk

- Grades = lab exercises + final project

E-mail Dr. Tseng at ttseng@spsu.edu

What is Bioinformatics?

Delta-F508: A deletion of the codon for phenylalanine (F) at position 508

Phenylalanine (Phe or F)

Helix 6   K335   R334

```
Human (CF)      S Q F S W I M P G T I K E N I I - G V S Y D E Y R Y R S V I K A C Q L E E D I S K F A
Human (normal)  S Q F S W I M P G T I K E N I I F G V S Y D E Y R Y R S V I K A C Q L E E D I S K F A
Mouse           S Q F S W I M P G T I K E N I I F G V S Y D E Y R Y K S V V K A C Q L Q Q D I T K F A
Rat             S Q I S W I M P G T I K E N I I F G V S Y D E Y R Y K S V V K A C Q L Q E D I T K F A
```

F508   Rd   Rd

Bio-: biological sequence information as the source

-informatics: the science of information, making information more accessible

- Study of computational methods to store and analyze biological data
- Suitable for computers:
  - Repetitive tasks, Complex calculation, Large datasets, Data mining: extraction of information from sequence data

Why study bioinformatics?

Genome **Medicine**

MUSINGS

The $1,000 genome, the $100,000 analysis?

Elaine R Mardis*

Having recently attended the Personal Genomes meeting at Cold Spring Harbor Laboratories (I was an organizer this year), I was struck by the number of talks that

required for it to occur. I therefore offer the following as food for thought.

One source of difficulty in using resequencing

Sodium Channel Auxiliary Subunits

Tsai-Tien Tseng[a]   Allison M. McMahon[b]   Victoria T. Johnson[c]
Erwin Z. Mangubat[d]   Robert J. Zahm[e]   Mary E. Pacold[e]   Eric Jakobsson[f]

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[c]School of Integrative Biology, [d]Department of Biochemistry, [e]Department of Computer Science, and
[f]Department of Molecular and Integrative Physiology, University of Illinois, Urbana-Champaign, Ill., USA

- **Potential career options**
  - CDC
  - Genome centers
- **Make your own discoveries!!!**
- **Complementary to other classes**
  - A combination of the following
    - Biochemistry
    - Molecular biology
    - Evolution
    - Computer Science
- **New skills**

Potential Topics

- Secondary structure prediction
- Gene function prediction
- Comparative genomics
- Similarity searches
- Molecular evolution
- 3-D visualization
- Genome assembly

SOUTHERN POLYTECHNIC STATE UNIVERSITY

BIOL 2500K Bioinformatics I

- Learning outcome
  - Know what bioinformatics is…
    - As a discovery science
  - How bioinformatics fits in with other fields:
    - Biochemistry
    - Molecular biology
    - Evolution
    - Computer Science