**Exploring a protein structure in the RCSB PDB: Green Fluorescent Protein**

**Learning Goals:**

1. Visualize the structure of a given molecule using RCSB PDB resources.
2. Explore the structure to understand its structure function relationships

**Exercise:**

Review the Molecule of the Month feature on Green Fluorescent Protein for background information (<http://pdb101.rcsb.org/motm/42>). Discuss main ideas of this feature with the students.

Note that there are a few PDB entries listed throughout the feature. For example note the PDB entry 1ema discussed in the “Exploring the structure section”.



Click on this to open the summary page for the PDB entry 1ema (<http://www.rcsb.org/pdb/explore/explore.do?structureId=1ema>).

Read/review the page and answer the following questions based on the descriptions provided:

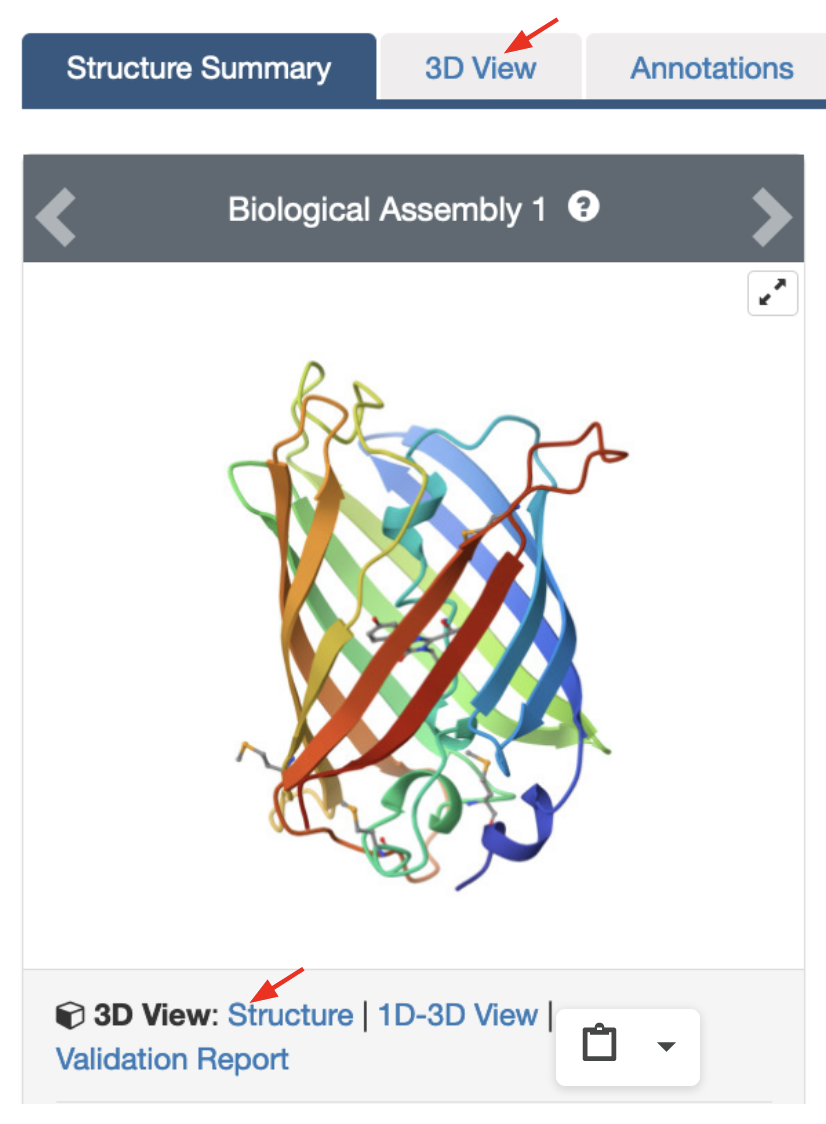
Q1. What is the source of the green fluorescent protein molecule seen in this structure?

Ans:

Q2. Name the authors who solved the structure of this protein?

Ans:

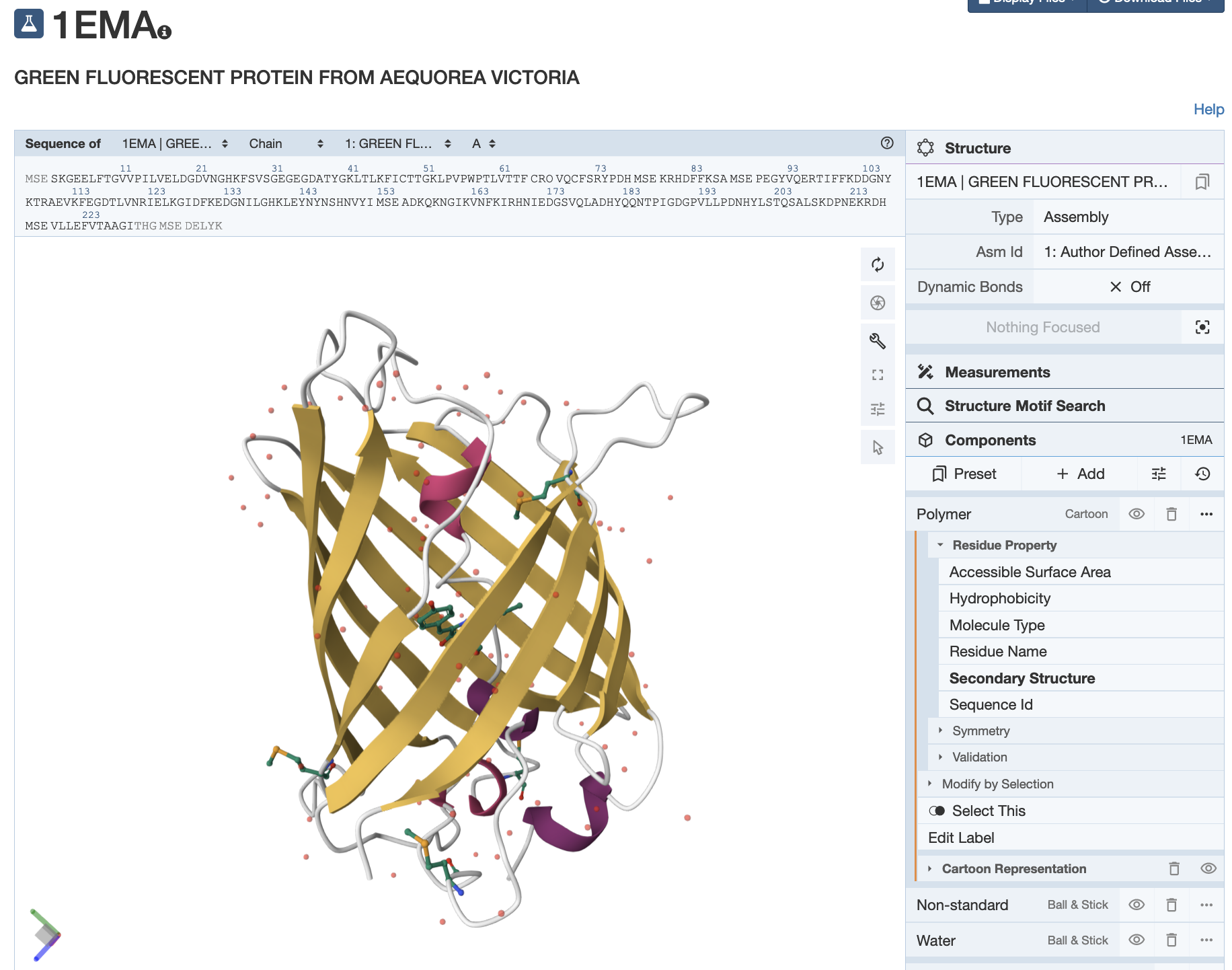
1. Explore the 3-D structure of this protein in Mol\* by clicking on the Structure hyperlink next to the 3D View written below the structure snapshot or by clicking on the 3D View tab or as shown below



The default view is colored by chain (i.e. each protein or polymer chain in the structure is colored in a different color).

Color the polymer chains in the structure by secondary structural elements using the following steps.

* 1. In the right hand Control Panel under Components click on the three dots on the right of the Polymer.
  2. From the options presented click on Set Coloring >> Residue Property >> Secondary structure. This should color the alpha helices one color and the beta strands in another color.



1. View the polymer chains shown to contain helical ribbons (in magenta), arrows (in golden yellow) and coil-like regions (white/gray).

Rotate the molecule and examine it.

Q3. How many beta-strands do you see in this structure?

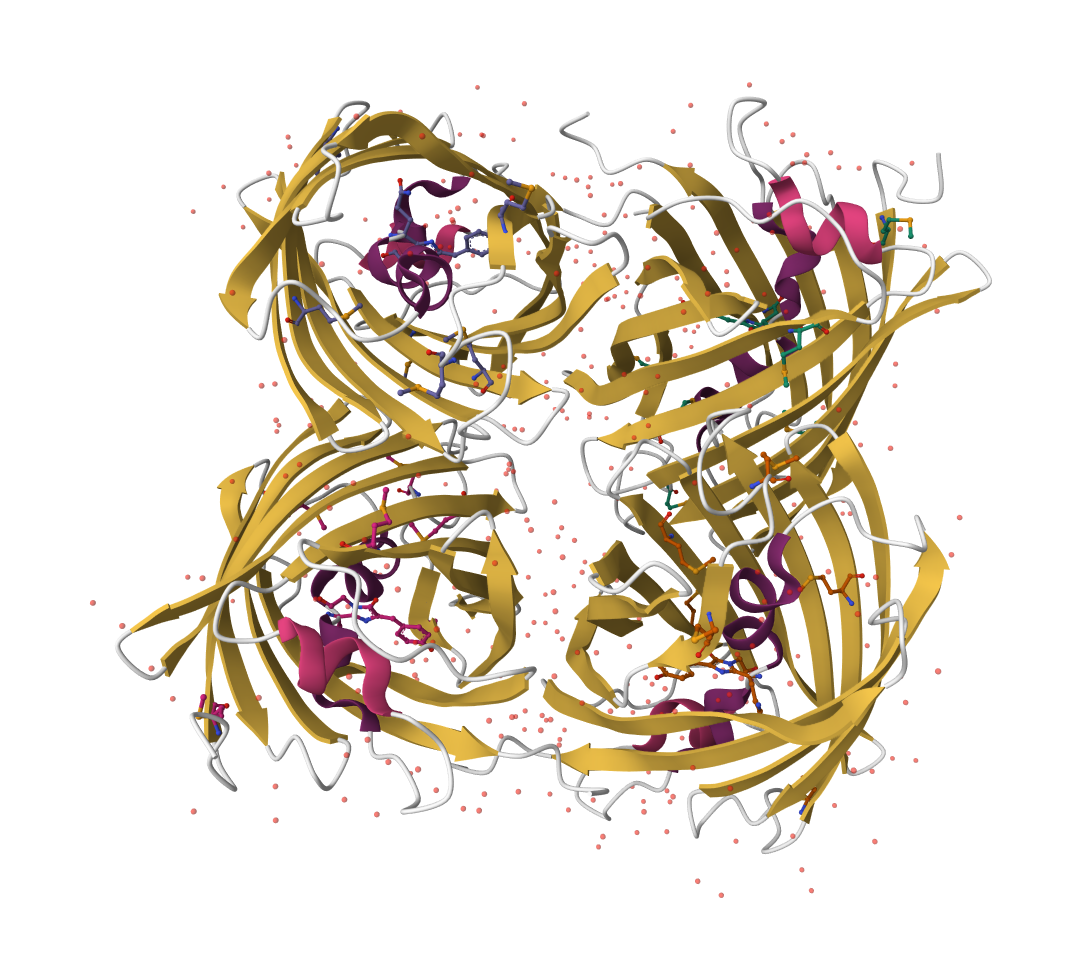
Ans:

1. Explore the atoms shown in ball and stick representation in the middle of the structure.

Q4. What do they represent?

Ans:

1. In a different tab or browser window, open the Mol\* view for the PDB entry 1g7k and explore it.



Q5. Compare what you see to the structure seen for PDB entry 1ema – note at least two points about how these structures are similar and two points about how they are different.

Ans: