Protein Crystallization for 3D Analysis

Proteins rule the World. Proteins are the building blocks of life. They make up and determine our skin, hair, eyes, and our very being. From glycolysis, to development, to the carrying of oxygen by haemoglobin, the 3-dimensional structure of proteins determines their function. Interestingly, few haemoglobin 3-dimensional structures are known across the many vertebrates inhabiting our world. We began an investigation into the variety of haemoglobin structure across Wyoming's native species: American bison (*Bison bison*), pronghorn antelope (*Antilocapra americana*), white-tailed deer (*Odocoileus virginianus*), mule deer (*O. hemionus*), wapiti or elk (*Cervus canadensis*), Gray-Crowned Rosy Finch (*Leucosticte tephrocotis*), Pinyon Jay (*Gymnorhinus cyanocephalus*), and Red-winged Blackbird (*Agelaius phoeniceus*). Initially, we practiced our technique with the hanging drop method in growing the simple enzyme lysozyme. Once the hanging drop method was successful, we then graduated to use of a CrystalChip protocol on extracted haemoglobin. With haemoglobin crystals we will attend a 'Fall Protein Bootcamp' at University of Wyoming where we will describe our different forms of haemoglobins in 3-dimensional space with Single-Crystal X-Ray Diffraction Platform. If we're able to understand the structure of haemoglobin better, we will have a better understanding of life itself. Indeed, Proteins rule the World.