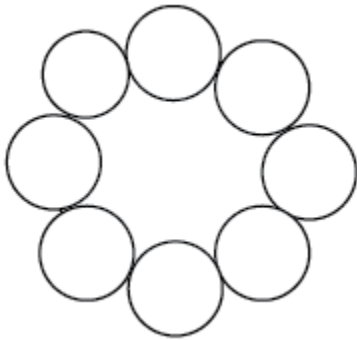


## Membrane Proteins

Integral membrane proteins often contain helical segments of appropriate length to span the lipid bilayer. In a protein that has a single segment that spans the membrane, the helix usually only contains hydrophobic residues and is called a single-span membrane protein. In transmembrane proteins with multiple segments that span the membrane, hydrophilic residues are often found in sequences of the helices.

1. Why are hydrophobic residues favored in single-span membrane proteins?
2. The model below shows the arrangement of helices in a multi-spanning transmembrane protein that serves as a passive pore for glucose (so glucose can move freely from one side of the membrane to the other). Using the heptad repeat pattern, propose a 14 amino acid sequence that might form one of the helices in this protein.



3. Propose a structural orientation for multiple hydrophilic residues of the helices of a multi-span protein that does NOT form a pore. Why did you choose to hydrophilic residues in those positions?
4. Only ~2% of the proteins in the Protein Data Bank are transmembrane proteins. From what you know about how the structure of proteins are determined, explain this observation.