Table 4. Student assumptions underlying alternative student reasoning about the biological molecules.

|  |  |
| --- | --- |
| **Student alternative assumptions** | **Example of alternative conceptions expressing these assumptions** |
| As goes macro, so goes micro | Fat molecules are round and bouncy.  Protein molecules are strong. |
| Source = substance | Examples of fats are potato chips, bacon, and butter.  Starch contains sugar, so it should test positive for sugar. |
| Molecule/energy equivalence | Sugar is energy.  Calories are a kind of fat.  Plants get food from the sun. |
| Like acts upon like | DNA polymerase acts on DNA, so it is a nucleic acid.  Amylase acts on starch, so it is a carbohydrate. |
| Functional equivalence | Sugars are fats (or contain fats) because they both contribute to weight gain.  Protein is a kind of carbohydrate because it gives energy. |
| Functional limitation | Protein is needed only for energy and muscle building.  Fat is needed only for energy. |