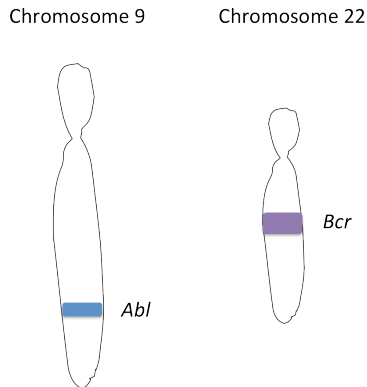


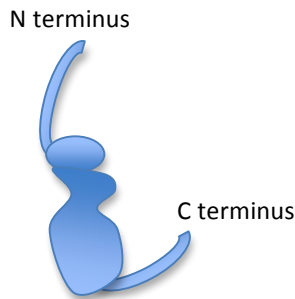
Translocation Activity (after segment #3)

One type of DNA rearrangement that can mutate genes and cause cancer is called a translocation, in which two chromosomes swap their ends. This type of translocation occurs in patients with “chronic myelogenous leukemia” (CML), a cancer of white blood cells. This translocation results in a physical fusion of the two genes that encode for *Bcr* and *Abl*. Normally (in non-cancerous cells), the *Bcr* gene is located on chromosome 22, and the *Abl* gene is normally on chromosome 9, as shown below:

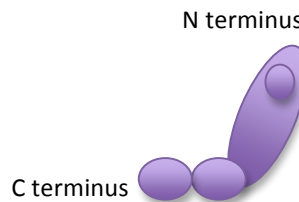


These genes are then transcribed and translated into amino acid chains that fold into the completed Bcr and Abl proteins. Amino acid chains are asymmetrical and have an “N terminus” and a “C terminus”, and proteins are formed in the N → C direction.

Normally, the gene for *Abl* produces a protein that looks like this:



Normally, the gene for *Bcr* produces a protein that looks like this:



1) Based on the diagrams above, draw what chromosomes 9 & 22 would look like in a CML cancer cell, and mark where the *Bcr* and *Abl* genes would be located.

2) Based on the diagrams above, draw what the *Bcr-Abl* fusion protein would look like in a CML cancer cell, and mark where the N- & C-terminus ends would be located.