**Title: Human Protein Disulfide Isomerase**

SMART Teams

**Exploring the**

**Molecular World**

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**Color Guide**

**Dark green- Alpha helices**

**Light green- Beta sheets**

**Light purple – hydrogen bonds**

**Dark red – disulfide bonds**

**Yellow – Residues that cleave the disulfide bond**

**Orange – residues that participate in the redox reaction**

To get inside the cell, residues on the B chain of Ricin bond to carbohydrates on the outside of the cell. Before the A chain (the chain which destroys ribosomes) can enter the cell, a single disulfide bond connecting the two chains must be cleaved. The enzyme which does this is Human Protein Disulfide Isomerase, or HDPI. The residues which cleave this bond, cysteines 397, 400, 53, and 56, are shown in yellow.

HPDI comes in two configurations: oxidized and reduced. The oxidized version is shown on the left and the reduced form is shown on the right. In the oxidized form, the distance between the active sites is around 40 Angstroms, but in the reduced form, this distance shrinks to 27 Angstroms. The oxidized form, as a result, has a more open hydrophobic core where subtrates can enter, and the rate of reaction increases.