1. In the absence of lactose:

When there is an absence of lactose, the LacI (Lac Repressor) is a repressor gene that releases a repressor protein from the mRNA. Once the repressor protein is transcribed, it binds to the operator of the Lac operon. Because there is an absence of lactose, there is not anything that can bind to the repressor protein that can unlatch from the operator. This, in turn, does not allow the RNA Polymerase to transcribe lacZ, lacY, and lacA. This also does not allow lacZ, lacY, and lacA to be genetically express.

Absence of Lactose Drawing:

A diagram of a diagram of a bird

Description automatically generated with medium confidence