

Each cell in a living organism functions thanks to the coordinated activity of many proteins. Different types of cells produce different sets of proteins, which determines their shape and function. Which proteins are produced (expressed) is determined by a special kind of proteins known as transcription factors. Transcription factors are typically activated in response to signals that the cell receives from the environment, which enables the cell to adjust to changes in its surroundings. Transcription factors bind to DNA and selectively induce or inhibit the production of other proteins. Therefore, they coordinate the production of proteins in the cell and play a key role in directing all its vital functions.

Gli proteins are transcription factors that belong to the hedgehog signaling pathway. They are essential for embryonic development, and their misregulation leads to birth defects and can be associated with oncogenesis. In our project, we will study the molecular mechanisms of regulation of protein expression by Gli proteins. In particular, we will study how other proteins cooperate with Gli proteins in the process of gene expression inhibition. We will also check if the suppression of gene expression by Gli proteins may be associated with cancer growth. This work may help develop new methods of targeted therapies against deficient Gli protein activation in cancer and in developmental defects.