Dendritic cells are special immune cells that act like the body's "security guards." They are experts at spotting threats, such as bacteria, viruses, or allergens and alerting the immune system to take action. By sending out signals, dendritic cells help other immune cells figure out which threats to fight off. This makes them an essential part of protecting us from infections. However, dendritic cells don't always work in our favor—they can sometimes cause problems by overreacting, leading to excessive inflammation, which can make autoimmune conditions like allergies and asthma worse.

What makes dendritic cells even more fascinating is that they have a dual role: not only can they trigger an immune response, but under certain conditions, they can also suppress it. This means they help decide whether our bodies react strongly to something or remain calm. For example, in the case of allergies, dendritic cells play a key role in determining whether our body sees something like pollen as harmless or something to fight against.
Dendritic cells are not all the same; they are a mixed group with many different subtypes, each with a unique job. We still do not fully understand how all these different dendritic cell subtypes work, especially when it comes to diseases like asthma.

Asthma is a condition where inflammation in the lungs makes it hard to breathe, and dendritic cells may play a big part in driving this inflammation. However, many questions remain unanswered, like how exactly dendritic cells contribute to asthma and why some types of these cells are more involved than others.

This project aims to uncover the secrets of dendritic cells in the lungs. We will study the different types of these cells, figure out where they are located in the lungs, and identify the key molecules that control their behavior. By focusing on asthma, we hope to better understand how dendritic cells contribute to the inflammation that makes it so hard for people with asthma to breathe. The goal is to create a detailed map of lung dendritic cells, including some lesser-known types, to paint a complete picture of how they work. We plan to develop new tools to study these cells more closely and pinpoint exactly what different subsets do in the lungs. With this knowledge, we will also look for new ways to regulate these cells—essentially finding ways to turn them "on" or "off" to help control asthma.

In the end, this research will give us a clearer understanding of lung dendritic cells and their role in allergic diseases like asthma. By uncovering how these cells contribute to disease, this work could open the door to new treatments that help people with asthma breathe easier and live healthier lives.