

# ABSTRACT

The immune system is essential for keeping the integrity of multicellular organisms. We were able to make a step forward in studying the complex immune reactions in mammals *in vivo* and/ or *in situ* using the major histocompatibility complex (MHC) class II/ enhanced green fluorescent protein (EGFP) knock-in mouse model. Due to the EGFP visualization of MHC II expressing cells we were able to observe antigen presenting cells, which are essential for the onset of immune responses, in their natural environment. Thus, we report some original features of the immune system.

We have identified MHC II<sup>+</sup> cell clusters with unknown, probably unique function, in the intestine. We have also described MHC II<sup>+</sup> cell migration to the lactating mammary gland and tested few hypotheses about the role of this phenomenon for the development of the mammary gland, milk secretion or infant immune system establishment.

Lastly, we observed residential macrophages in the cornea. The presence of APCs in the cornea is a very contradictory issue due to the fact that cornea is an immunologically privileged tissue and therefore harbors special immune features.

**key words:** antigen presenting cells (APC), major histocompatibility complex class II (MHC II), enhanced green fluorescent protein (EGFP), immune system, knock-in mouse model