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Singapore: Scientists at A*STAR's Singapore Immunology Network (SIgN) have discovered the origin of a group of skin-deep immune cells that act as the first line of defence against harmful germs and skin infections. SIgN scientists discovered that these sentry cells of the skin, called the Langerhans cells (LCs), originate from two distinct embryonic sites - the early yolk sac and the foetal liver.

LCs are dendritic cells (DCs) found in the outermost layer of the skin. DCs are a critical component of the immune system because they are the only cells able to 'see' and 'alert' other responding immune cells to initiate a protective response against harmful foreign invaders. Like sentries of the immune system, DCs are strategically positioned where they are likely to encounter harmful pathogens. Identifying the source of these specialised immune cells may hold exciting possibilities to novel strategies for vaccination and treatment of autoimmune diseases and inflammatory skin disorders.

In contrast to other DCs that are constantly replaced by a circulating pool of bone marrow-derived precursors, LCs have the interesting ability to maintain themselves throughout life. While it is established that these long-lived sentry cells of the skin arise from precursors that are recruited to the skin prior to birth, this is the first time that the exact origin of the precursors of LCs is revealed through advanced fate-mapping technique (a method of tracing cell lineages to their embryonic origin).

Dr Florent Ginhoux Ginhoux, principal investigator of SIgN, said, "Whether this unique dual origin of Langerhans cells influences their ability to maintain skin integrity or dictate their specialised immune functions in response to microbes and

vaccines needs to be examined. But having identified their origin surely opens new possibilities of using them as novel vaccination strategies or as therapeutic tool for treating inflammatory skin diseases like psoriasis."

Scientific Director of SIgN Professor Paola Castagnoli said, "This discovery sheds light on understanding the complexities of the immune system, in particular the relationship between immune responses and human diseases. It will bring us closer to our goal of discovering novel ways of treating and preventing a range of immune diseases that will impact healthcare."