



Serge VAN DE PAVERT

PhD, CR1 Inserm

Group leader: Development of the Immune System

Background

Serge van de Pavert obtained his Ph.D. from the Veterinary Faculty at the University Utrecht, the Netherlands, on the maternal influence on porcine embryo development.

After a postdoc at the Netherlands Ophthalmic Research Institute in Amsterdam, the Netherlands, within the group of dr. Jan Wijnholds on mouse models for eye-diseases, he started a postdoc with prof.dr. Reina Mebius at the VU University Medical Center, Amsterdam, the Netherlands. The work in this group led to seminal discoveries on lymph node development under the influence of retinoic acid. Since the discovery was made that the maternal diet during pregnancy affects lymph node size and consequent immune responses life long in offspring, this led to the statement that "you are what your mother ate". A project was started on embryonic lymphatic vasculature development in collaboration with the clinical departments Gynaecology and Clinical Genetics to study the molecular mechanism that could lead to increased nuchal edema. To explore the applied side of science, he subsequently worked as postdoc at the Hubrecht Institute, Utrecht, within the group of prof.dr. Stefan Schulte-Merker to develop a proof of concept for the application of lymphangiogenic viral therapy. Being in one of the top-institutes on developmental biology, he also analyzed embryonic lymphatic vasculature development.

He was recruited to the CIML in June 2015 and established the research group "Development of the Immune System", which focusses on embryonic development of the immune system. The overall objective is to characterize all players involved in development of the immune system, specifically in relation to the formation of lymph nodes and lymphatic vasculature. Especially, the role of the maternal diet during pregnancy will be studied on its effect on processes within the embryo that could affect lymph node and/or lymphatic vasculature development.

Awards

- 2015. A*MIDEX chaire d'excellence
- 2015. FRM jeunes equipes
- 2015. CR1 Inserm position

Main achievements and questions

The finding that vitamin A within the diet of the pregnant mice led to irrevocable changes in the development of the immune system of her offspring with a life long effect on immunity is a fascinating concept. It means that the functionality of your immune system is also determined by what your mother ate! The question is then how the diet of pregnant women should be balanced to warrant a functional immune system of her offspring. Are there other substances than vitamin A that can affect embryonic development of the lymph nodes and/or lymphatic vasculature?

Selected publications

Original publications

- Santori FR, Huang P, van de Pavert SA, Douglass EF Jr, Leaver DJ, Haubrich BA, Keber R, Lorbek G, Konijn T, Rosales BN, Rozman D, Horvat S, Rahier A, Mebius RE, Rastinejad F, Nes WD, Littman DR. Identification of natural ROR γ ligands that regulate the development of lymphoid cells. Cell Metab. 2015, 21:286-97
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- van de Pavert SA, Ferreira M, Domingues RG, Ribeiro H, Molenaar R, Moreira-Santos L, Almeida FF, Ibiza S, Barbosa I, Goverse G, Labão-Almeida C, Godinho-Silva C, Konijn T, Schooneman D, O'Toole T, Mizze MR, Habani Y, Haak E, Santori FR, Littman DR, Schulte-Merker S, Dzierzak E, Simas JP, Mebius RE, Veiga-Fernandes H. Maternal retinoids control type 3 innate lymphoid cells and set the offspring immunity. Nature. 2014, 508:123-7
- van de Pavert SA, Mebius RE. Development of secondary lymphoid organs in relation to lymphatic vasculature. Adv Anat Embryol Cell Biol. 2014, 214:81-91
- van de Pavert SA, Mebius RE. New insights into the development of lymphoid tissues. Nat Rev Immunol. 2010, 10:664-74
- van de Pavert SA, Olivier BJ, Goverse G, Vondenhoff MF, Greuter M, Beke P, Kusser K, Höpken UE, Lipp M, Niederreither K, Blomhoff R, Sitnik K, Agace WW, Randall TD, de Jonge WJ, Mebius RE. Chemokine CXCL13 is essential for lymph node initiation and is induced by retinoic acid and neuronal stimulation. Nat Immunol. 2009, 10:1193-9