

# Characterisation of chicken FLT3+ XCR1+ conventional dendritic cells (cDC) highlights conservation and divergences in amniote cDC function and development

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Introduction: Comparative transcriptomic studies have enabled the identification of conventional dendritic cells (cDC) in a large number of different mammalian species and more recently chickens. These studies elegantly demonstrate the evolutionary conservation of cDC in amniotes; however, little information is available on the specific developmental and functional biology of avian cDC.

Methods: We have developed specific reagents that in combination with the CSF1R-eGFP transgenic reporter chicken allow the specific identification, characterisation and isolation of chicken Flt3+ XCR1+ cDC.

Results: Chicken XCR1+ cDC subset closely resembles the mammalian cDC1 subset, suggesting a conserved functional specialisation for antigen cross-presentation. However, substantial differences are observed, which likely reflecting the unique biology of the avian immune system. These avian specialisations include a lack of lymph nodes, with secondary lymphoid tissues largely consisting of a distributed network of lymphoid follicles in peripheral organs. Chicken XCR1+ cDC are widely distributed in both lymphoid and non-lymphoid tissues and make up approximately 30-40% of the mononuclear phagocyte cell population in the spleen and mucosal tissues. In contrast to mammalian XCR1+ cDC1, chicken XCR1+ cDC express high amount of CSF1R and lacks detectable GM-CSF1R expression. Furthermore while we readily detect XCR1+ cDC in avian tissues, in contrast to mammals we are unable to detect either XCR1+ cDC nor cDC progenitors in chicken blood.

Conclusion: These data suggest that while some XCR1+ cDC1 function are conserved between amniotes, mechanisms controlling XCR1+ cDC development and homeostasis varies between mammals and birds. In this presentation we will discuss the specific developmental and functional biology of avian XCR1+ cDC and contrast this to what is known of mammalian cDC, as well as present an update on the progress in making gene edited XCR1+ cDC knockout and reporter lines of chickens.

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