

# Generation of monocytes-derived dendritic cells from chicken blood for in vitro studies

**Commonly used acronym:** DENDRICHICK

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## Organisation

**Name of the organisation** Sciensano

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**Country** Belgium

## SCOPE OF THE METHOD

<b>The Method relates to</b>	Animal health
<b>The Method is situated in</b>	Regulatory use - Routine production, Translational - Applied Research
<b>Type of method</b>	In vitro - Ex vivo
<b>Species from which cells/tissues/organs are derived</b>	Gallus gallus domesticus
<b>Type of cells/tissues/organs</b>	Blood

## DESCRIPTION

### Method keywords

Monocytes

dendritic cells

chicken

PBMC

### **Scientific area keywords**

Dendritic cells isolation

Immunology

vaccination

immunogenicity

### **Method description**

The purpose of the present development is to use avian MoDCs to implement a cellular platform to increase understanding of the immune responses induced by various antigens of interest (e.g. vaccine candidates) and evaluate their immunogenic potential. Considering the difficulty to work on dendritic cells (DCs) isolated *ex vivo*, we developed a protocol for using *in vitro*-generated chicken monocyte-derived dendritic cells (MoDCs). Plastic-adherent peripheral blood mononuclear cells (PBMCs) isolated from specific-pathogen free (SPF) chickens are cultured with GM-CSF and IL-4 for 5 days at 41°C in 5% CO<sub>2</sub> atmosphere. Following antigen-induced maturation (e.g. LPS, polyinosinic-polycytidylic acid, viral antigens, etc.), typical DC morphology is confirmed by microscope. The endocytic capacity and the expression of surface expression of mannose receptor C-type 1-like B, MHC-II, myeloid markers CD11c, DEC205, and co-stimulatory molecules CD40, CD80, CD86 by MoDCs at different maturation states are assessed by flow cytometry.

### **Lab equipment**

Biosafety cabinet,

Cell incubator,

Microscope,

Centrifuge,

Flow cytometer.

### **Method status**

Still in development

## PROS, CONS & FUTURE POTENTIAL

### Advantages

- Poorly invasive (MoDCs used in place of bone marrow-derived DCs);
- Makes it possible to assess the response to an antigen in a large number of individuals and thus evaluate individual variability.

### Challenges

Antibodies for cell characterization are not all commercially available.

### Future & Other applications

- Selection of immunopotentiating agents (e.g. adjuvants) during vaccine development;
- Antigen-pulsed MoDCs will be co-cultured with naïve purified T cells to characterize cell-mediated responses triggered by vaccine candidates *in vitro*.

## REFERENCES, ASSOCIATED DOCUMENTS AND OTHER INFORMATION

### References

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- Van den Biggelaar RHGA, van der Maas L, Meiring HD, Pennings JLA, van Eden W, Rutten VPMG, et al. Proteomic analysis of chicken bone marrow-derived dendritic cells in response to an inactivated IBV + NDV poultry vaccine. *Sci Rep* 2021;11:12666. <https://doi.org/10.1038/s41598-021-89810-3>.

### **Associated documents**

[2023\\_RE-Place\\_protocol.pdf](#)

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