



**AVIAMED**



# **AVIAn viral disease prevention and control with plant vaccines for the MEDiterranean area**

**(2016 – 2019)**

**Overall budget: 733600 €**

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**ARIMNet & ARIMNet2 meeting – 14-16 March 2016, Lisbon, Portugal**



# CONSORTIUM



**5 research teams** from 3 Mediterranean countries (**Egypt, Italy, Morocco**) with complementary competences in **plant biotechnologies, immunology, veterinary sciences** to overcome research fragmentation and to promote sustainable growth and development



- Agricultural Genetic Engineering Research Institute, AGERI, Egypt



- Italian National Agency for New Technologies, Energy and Sustainable Economic Development, ENEA, Italy (Coordinator)



- Istituto Zooprofilattico Sperimentale delle Venezie, IZSve, Italy (Italian health authority and research organization for animal health and food safety)



- Institute of Agronomy and Veterinary Hassan II, IAV, Morocco



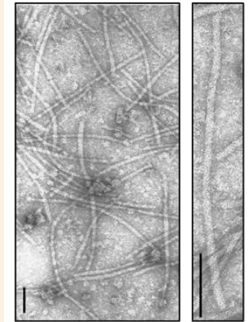
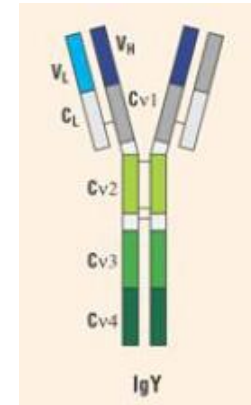
- National Institute of Agricultural Research of Morocco, INRA, Morocco

# AVIAMED OBJECTIVES



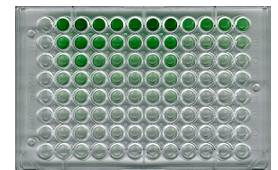
To use plants as *biofactories* for the transient and stable expression of Infectious Bursal Disease virus (IBDV) and Newcastle Disease virus (NDV) antigens in their native forms or as fusion to:

- The fragment crystallizable region of chicken IgY immunoglobulins
- The coat protein of the plant virus Potato virus X

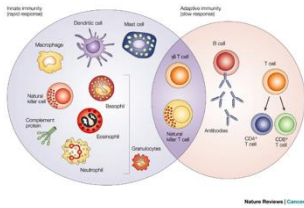


To use the plant expressed recombinant antigens (subunit vaccines) to:

- Evaluate the type of immune responses they activate *in vivo*
- Evaluate the efficacy in terms of clinical protection and virus shedding following experimental challenge
- Set up novel diagnostic assays



# SCIENTIFIC APPROACH



**WP1- Antigen selection and design to improve intrinsic immunogenicity (ideal vaccine)**

**Leader: ENEA-Italy; Other participants: IZSve-Italy; IAV-Morocco**



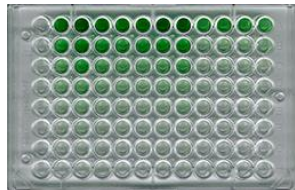
**WP2- Production of the antigens in plants by transient (*Nicotiana benthamiana*) and stable (*Zea mays*) transformation technologies**

**Leader: AGERI-Egypt; Other participants: ENEA-Italy; INRA-Morocco**



**WP3- Evaluation of antigens efficacy in poultry**

**Leader: IAV-Morocco; Other Participants: IZSve-Italy**



**WP4- Development of DIVA strategies and new diagnostic assays**

**Leader: IZSve-Italy; Other participants: ENEA-Italy; IAV- and INRA-Morocco**



**WP5- Project networking activities and dissemination**

**Leader: INRA-Morocco; Other participants: all the partners**



# EXPECTED IMPACT & INNOVATION

## Innovative outputs

- innovative methods to improve the intrinsic immunogenicity of recombinant antigens (subunit vaccines)
- low costs and easy scale up of recombinant antigens (subunit vaccines) production using plant as *biofactories*
- development of low-cost and ready to use diagnostic tools able to differentiate infected from vaccinated animals



## Impact

- animal healthcare
- creation of new knowledge in the Mediterranean area
- technology transfer among Mediterranean countries





**AGERI-Egypt**

IBDV-PFcY Maize

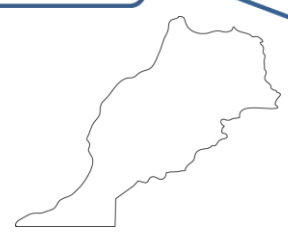
IBDV-VP2His  
*N. benthamiana*

Technology transfer

**INRA-Morocco**

IBDV-VP2His Maize

VP3  
*N. benthamiana*



Project Coordination

**ENEA-Italy**

Antigens optimization  
(IBDV, NDV)

NDV-F1FcY  
PVX-2A-NDV-F1  
*N. benthamiana*

Technology transfer



**IAV-Morocco**

Antigens efficacy  
evaluation in chickens  
(IBDV)

Diagnostic assay  
(IBDV)

**ISZVe-Italy**

Antigens efficacy  
evaluation in chickens  
(NDV)

Diagnostic assay (NDV)

Technology transfer



**Thank you for your attention!**