INFECTIOUS DISEASES (BACTERIAL, FUNGAL, VIRAL, PARASITIC, INFESTATIONS)

5 YEARS' EXPERIENCE USING A PORCINE ANIMAL MODEL FOR SCABIES: WHAT DID WE LEARN TO IMPROVE THE THERAPEUTIC MANAGEMENT OF HUMAN SCABIES ?

C Bernigaud [1] - F Fang [2] - D Fernando [3] - K Sanders [4] - L Nattkemper [4] - H Lu [3] - F Botterel [5] - G Yosipovitch [4] - A Lespine [6] - J Guillot [7] - K Fischer [3] - O Chosidow [8]

Research Group Dynamyc, Ea 7380, Enva, Université Paris-est, Dermatology Department, Ap-hp, Hôpital Henri Mondor, Créteil, France [1] - Research Group Dynamyc, Ea 7380, Enva, Université Paris-est , Créteil, France, Department Of Parasitology, College Of Animal Science And Technology, Guangxi University, Nanning, China, Nanning, China [2] - Qimr Berghofer Medical Research Institute, Infectious Diseases, Brisbane, Australia [3] - Miami Itch Center, University Of Miami Miller School Of Medicine, Department Of Dermatology And Cutaneous Surgery, University Of Miami Miller School Of Medicine, Miami, United States [4] - Research Group Dynamyc, Ea 7380, Enva, Université Paris-est, Parsitology-mycology, Créteil, France [5] - Toxalim, Research Centre In Food Toxicology, Inra, Inp-envt, Inp-ei-purpan, Université De Toulouse, Toulouse, Toulouse, France [6] - Research Group Dynamyc, Ea 7380, Enva, Université Paris-est, Parasitology-mycology, Créteil, France [7] - Dermatology Department, Ap-hp, Hôpital Henri Mondor, Ile-de-france, Créteil, France [8]

Background: Scabies is one of the commonest dermatological diseases, affecting 200 million people/year with a significant burden, however largely underexplored. The recent addition of scabies to the WHO list of neglected tropical diseases highlighted the urgent need for better control.

Objective: To establish an experimental animal model to study and improve the therapeutic management of human scabies.

Materials and Methods: A porcine scabies model previously developed in Australia was reproduced in France 5 years ago. We initiated a collaborative program to use the model to (i) explore novel therapeutic targets and their pharmacokinetics (ii) increase knowledge about existing acaricides (iii) investigate scabies itch molecular mechanisms to identify potential specific therapeutic targets and (iv) provide the data basis for standardized recommendations regarding environmental scabies control. Work received ethical approval from both Australian and French animal ethics committees.

Results: Four major studies have been performed: (i) two preclinical therapeutic trials where we found that oral moxidectin 0.3mg/kg or oral afoxolaner 2.5mg/kg given once were more

efficient in mites killing than oral ivermectin 0.2 mg/kg given twice and where moxidectin and afoxolaner's plasma and skin half-lives were able to cover the entire mite life-cycle (ii) a large in vitro study looking at ovicidal activities of several acaricides where we found that most topical agents were ovicidal but not macrocyclic lactones and isoxazolines families; (iii) a study analysing scabies infested-pig biopsies where we found that non-histaminergic itch mediators (TRPV1, TRPA1, PAR-2) were significantly increased compared to controls ; (iv) a real-life study comparing the elimination of mites and eggs in textiles where we found that the best conditions were using machine washing (short cycle, 50°C), drying (10 min), freezing (5 hours), or isolation in plastic bags.

Conclusions: The porcine experimental model of scabies provided potential data to support human scabies control improvement.