



HAL
open science

Assessment of toxicity to food contaminants as mycotoxins in pigs: development and use of ex vivo organ culture models as an alternative to animal experimentation

Delphine Payros, Laura Soler, Marion Garofalo, Carine Al-Ayoubi, Olivia Labat, Aurore Durant, Nina Le Moël, Sylvie Puel, Marie Penary, Mikaël Albin, et al.

► **To cite this version:**

Delphine Payros, Laura Soler, Marion Garofalo, Carine Al-Ayoubi, Olivia Labat, et al.. Assessment of toxicity to food contaminants as mycotoxins in pigs: development and use of ex vivo organ culture models as an alternative to animal experimentation. Séminaire du réseau HOLO-AE: Holobionte et animaux d'élevage, Dec 2024, Paris, France. <hal-04905008>

HAL Id: hal-04905008

<https://hal.science/hal-04905008v1>

Submitted on 21 Jan 2025

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



HAL Authorization

Assessment of toxicity to food contaminants as mycotoxins in pigs: development and use of *ex vivo* organ culture models as an alternative to animal experimentation.

Delphine Payros¹, Laura Soler¹, Marion Garofalo¹, Carine Al-Ayoubi¹, Olivia Labat¹, Aurore Durant^{1,2}, Nina Le Moël¹, Sylvie Puel¹, Marie Penary², Mikaël Albin¹, Elodie Rousseau-Bacquié¹, Ana Paula Bracarense³, Isabelle P. Oswald¹, Philippe Pinton¹

¹INRAE, UMR1331, Toxalim, Research Centre in Food Toxicology, Toulouse, France.

²IRSD, Université de Toulouse, INSERM, INRAE, ENVT, UPS, Toulouse, France

³Laboratory of Animal Pathology, Universidade Estadual de Londrina, Londrina, Brazil

delphine.payros@inrae.fr ; philippe.pinton@inrae.fr

The objective of our research is to assess the toxic effects of food contaminants, such as mycotoxins, on different target organs (e.g., intestine, liver, kidney), using *ex vivo* organ culture. This approach aims to reduce the number of animals used for scientific purposes. Indeed, in the context of assessing cocktail effects in toxicology, the digestive tract (intestine and liver) and the urinary tract (bladder and kidney) are important targets because of their role as physical and immune barriers, as well as their involvement in the biotransformation and excretion of xenobiotics. The presence of contaminants, especially food contaminants, can alter their function and endanger animals who are exposed to them. The integration of transcriptomic and proteomic approaches, coupled with histomorphological analysis, allows the identification of new potential threats to animal health and the elucidation of underlying mechanisms.

In our team, we used intestinal explants and precision cut liver slices to assess the effects of mycotoxins, alone or in combination, on pig health and identify strategy to reduce their toxicity. Our studies demonstrate that these experimental models facilitate the screening of mycotoxins with various effects, immunotoxic, reprotoxic, hepatotoxic.... Moreover, these models can be used to evaluate the efficacy of remediation strategies, such as prebiotics or probiotics that have been developed to counteract the effects of these toxins. These alternative models allow the maintenance of tissue architecture, the control of exposure conditions, and the preparation of a large number of biological replicates from the same animal. Consequently, this approach contributes to a reduction in the number of animals used for scientific purposes, thereby advancing the ethical standards of animal research.

Our next objective is to develop new experimental models, notably in conjunction with specific epithelia, such as those of the urinary tract (bladder and kidney) or the pulmonary system. This will facilitate the investigations of the effects of mycotoxins on these organs. Furthermore, as in the intestine, the interactions between microbial agents, probiotics, commensals or pathogens, are of significant relevance in these organs and could provide important insight into the action of combined effects of microbial agents and xenobiotics on animal health.

Keywords : alternative models, food contaminants, target organs, pigs, toxicology