

The impact of the microbiome on animal models – An overview

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Mice from different breeders or rooms exhibit substantial variation in model expression. Therefore, often data from mice are not reproducible in other similar mouse studies or applicable for the human patients, a phenomenon known as the reproducibility or translation crisis. It seems nowadays to be generally accepted that for certain traits the gut microbiota influences laboratory mice more than genetics does. Also, natural ingredient diets have a substantial batch variation, and they have an essential impact on the gut microbiota, and subsequently on the model expression. Commercial specific pathogen free mice have immune systems comparable to newborn babies, and, therefore, often fail to translate to adult human beings. Mouse models can be changed by phage or microbiota transplantation, but while mouse-to-mouse transplantation results in a re-colonization rate of approximately 80 %, a human-to-mouse transplantation results in a re-colonization of approximately 40 %. Key anti-inflammatory human bacteria are among those most frequently lost, and human-to-mouse transplanted mice still have newborn baby immune systems. Therefore, instead of standardizing the mouse for a specific microbiota, it may be a wiser strategy to embrace the microbiota variation and incorporate it in the data evaluation, which may increase the power of mouse studies dramatically. Even dirty mice with pathogens and a more complex microbiota might be a future research tool, but it may also be possible to mimic the pathogen stimulation artificially without getting the pathogens back into the animal facilities.