Integrating animal research in the DOHaD paradigm, the world is awakening

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The recent decades have seen the emergence of new paradigms in biological research. With DOHaD, it is now clear that many diseases have origins during development, while the clinical signs may appear throughout the lifespan or be observed in subsequent generations. The One Health concept acknowledges that population health is dependent on the interactions between animal and human diseases in a social, biological and ecological environment. This concept can be extended to non-communicable diseases, where both humans and animals are subjected to similar environments that affect their long-time health and that of their offspring. In accordance to the 3R principles to limit the use of animals, cellular models and organoids are important for deciphering mechanisms at the organ level. Their interest, however, is limited for the study of programming, as the response to environment during pregnancy involves both the maternal and feto-placental compartments. Due to their short intergenerational interval and the possibility to control experimental conditions, animal models, primarily mammals, are thus still necessary to study long-term effects and mechanisms involved in the DOHaD, although physiological differences between species preclude the direct extrapolation of experimental data. Nevertheless, the astute choice of biologically relevant animals, depending on the scientific question, as well as the convergence of findings between species and conditions will benefit both humans and animals.