

The possible role of biological twins in the development of Artificial Intelligence solutions for precision medicine: targeted in vitro experiments as a complement to traditional data strategies

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AI and multi-scale digital twins show excellent promise for untangling of the complexity of oncological and neurodegenerative disorders by capturing the complexity and intercorrelation of the extremely large amount of variables typical of these pathologies.

The amount of data needed to efficiently train multiscale, explainable digital twins, however, is extremely difficult to obtain – the ideal amount of patients needed for such developments is often out of reach of single institutions, and some times even of consortia or large-scale multinational initiatives.

We will review the strategies for data collection and management, with a focus on the role of targeted in vitro experiments as a complement to the use of real world clinical data (data collected in the field during the course of day-to-day clinical practice), to the creation of ad-hoc clinical trials, to the use of open and synthetic data, highlighting achievable results, risks and costs for each, and presenting selected Artificial Intelligence models developed by aizoOn addressing relevant clinical questions.