

Cell culture technique in immunology: considering the *in vivo* influencing factors

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Opinion

Cell culture represents an important aspect of the biological and medical research in both mechanisms studies and pharmacological evaluations.^{1,2} It allows studying the cellular and molecular aspects within a certain contexts. However, cell-based tests allow the study/evaluation of parameters within a limited context compared to the *In Vivo* conditions. Indeed, under the *In Vivo* conditions the immune system is a part of a network that includes also other systems such as the hormonal system and the nervous system.³ Each one of the systems is in a continuous interaction with the other systems and within the same system continuous interactions have also been reported. These interactions could influence parameters such as cell growth, expression of certain receptors and the metabolic activities.

Therefore, the cell cultures on which immunological studies are based might not be fully extrapolated due to the differences in terms of influencing factors between the cell cultures conditions and the *In Vivo* conditions including the hormones and the neurotransmitters. Thus, adding factors such as immune factors, hormones and neurotransmitters, to mimic the *In Vivo* conditions, within the cell culture medium used to cultivate the immune cells would better mimic the *In Vivo* conditions toward a better extrapolation for the obtained results especially with the consideration of the exogenous molecules^{4,5} that can also influence the cell cultures of the immune cells.

The described concepts, although they have been defined for the cell cultures of the immune cells, are also applicable to the cell cultures derived from systems for which the constitutive cells are in continuous interactions either within the same system or with other systems.

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Conflicts of interest

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