

عنوان مقاله:

Three-Dimensional (3D) Cell Culture Conditions, Present and Future Improvements

محل انتشار:

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خلاصه مقاله:

Context: Early development of many organs shows many morphological and molecular similarities (teeth, lung, hair, kidney and etc.). Fundamental questions in organogenesis are related to the identification of a simplified model which is able to mimic the molecular mechanisms involved in pattern organization and cell fate determination as well. Evidence Acquisition: It is widely accepted that cells behave more natively if cultured in three-dimensional conditions. Advances in 3D non-destructive, non-invasive analysis methods and improvements in the multi-scale techniques and bioreactors to obtain test and culture 3D cell aggregates have been made. On the other hand, even if 3D aggregate culture methods are able to recapitulate in vitro the cell-extracellular matrix interactions properly observed in vivo, and the synthetic/natural matrix and scaffolds have biochemical and mechanical properties, in order to mimic the native extracellular matrix, both of these systems possesses some limitations and some methodological improvements are needed. Results: The processes by which re-aggregated adult single cell types or adult and embryonic explanted tissues are able to recapitulate embryogenesis in vitro, when cultured in adhesion or embedded in 3D gels, is not surprising and is clearly under the control of a reminiscent cellular memory which recapitulates early developmental stages. Conclusions: Our underlying hypothesis is that recapitulating the three-dimensional early embryonic structure, in order to reproduce better in vitro the three-dimensional morphogenetic-like re-arrangements, would improve cells differentiation, when in vivo transplanted; moreover, it could be used as a simplified cancer disease model and reliable drug evaluation method as well.

کلمات کلیدی:

Cell Culture Techniques; Organogenesis; Asymmetric Cell Division

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