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Evaluation of the major royal jelly proteins as an alternative to fetal bovine serum in culturing human cell lines

Key words:
Major royal jelly proteins (MRJPs), Cell culture, Alternative, Fetal bovine serum (FBS)

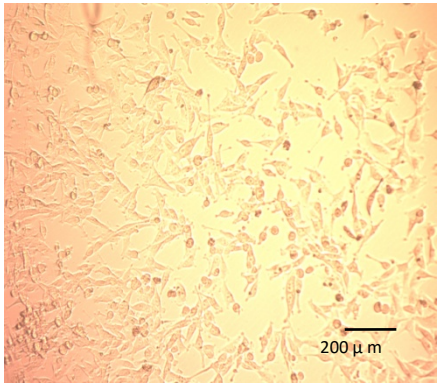
Research Summary

The major royal jelly proteins (MRJPs) are the main active constituents. In order to determine whether MRJPs can be used as an alternative to Fetal Bovine Serum (FBS) in different types of human cell culture, the proliferation of the complex serum with different ratios of MRJPs /FBS (M/F) was evaluated on five human cell lines:

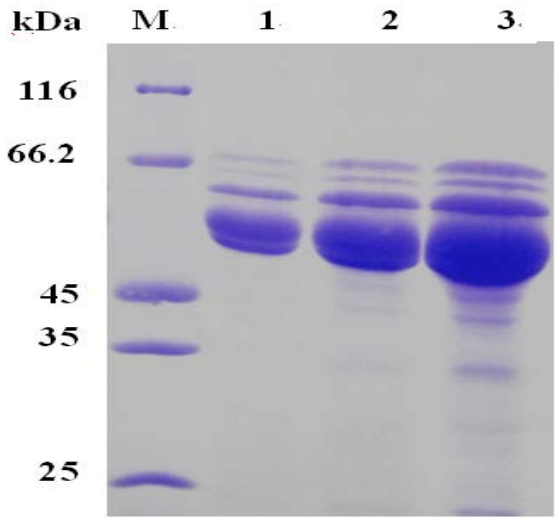
Royal jelly

The complex serum with MRJPs/FBS 4/6 possessed the highest proliferation activity similar to or in excess of FBS.

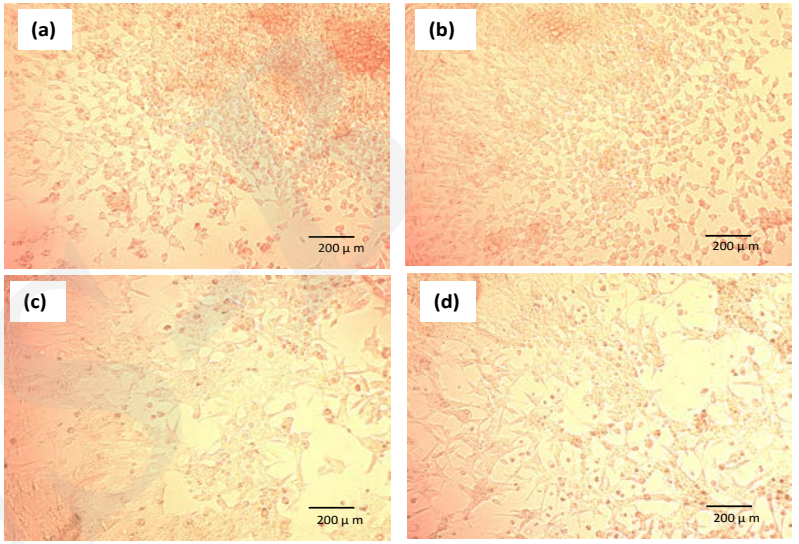
The complex medium with MRJPs / FBS 6/4 together with two cytokines, epidermal growth factor (EGF), and Insulin-Transferrin-Selenium (ITS) promoted proliferation of four human cell lines significantly.



Innovation points



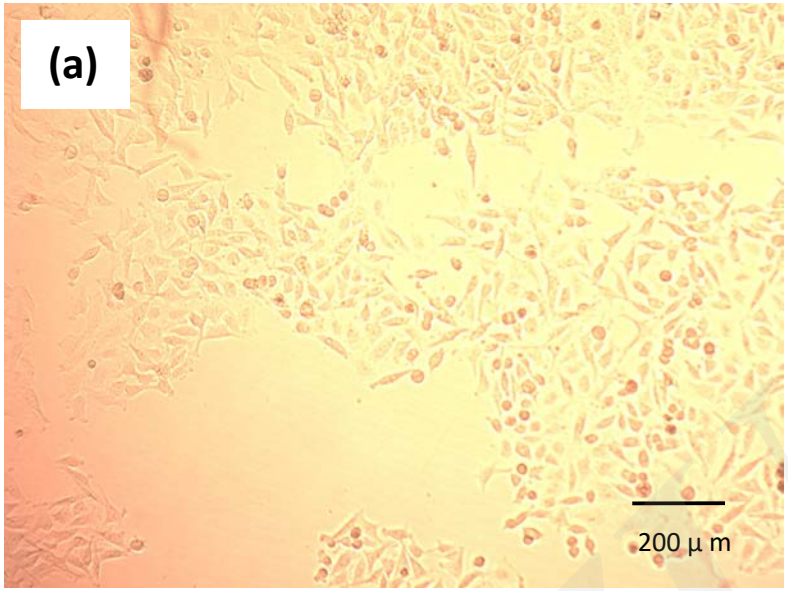
SDS –PAGE analysis of MRJPs



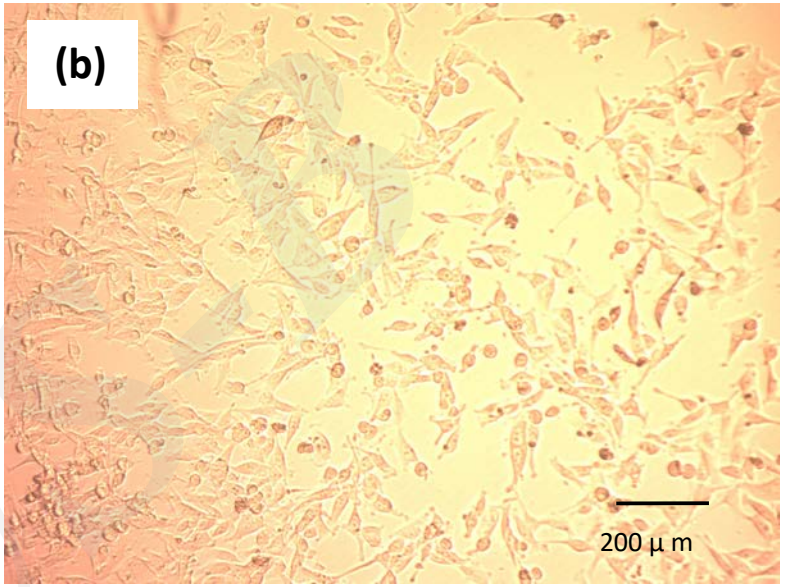
Cellular morphology of 293T and HCT116 (5th d) treated by the complex M/F 6/4 serum and FBS. (a) 293T+FBS. (b) 293T+F/M 6/4. (c) HCT116+FBS. (d) HCT116+ F/M 6/4

This investigation demonstrated further that the complex MRJPs/FBS 6/4 serum possesses significant proliferation activity on four human cell lines, Changliver, 293T, HFL-I and HCT116, but has little effect on the 231 cell, indicating selectivity of MRJP to cell types.

Innovation points



(a) Changliver cell culturing in medium with FBS+MRJPs.



(b) Changliver cell culturing in medium with FBS+MRJPs +EGF+ITS

that the complex MRJPs/FBS 6/4 serum supplementing both cytokines with epidermal growth factor (EGF) and Insulin-Transferrin-Selenium (ITS) increased cell viability in four cell lines: Changliver, 293T, HFL-I and HCT116 by 18.73%-56.19% compared to the complex MRJPs/FBS 6/4 serum.

Prospection

- The usage of FBS faces both moral and scientific obstacles because of the limited sources, the composition changes between batches and possible contamination from viruses, mycoplasm, and prions.
- Our findings that MRJPs could partially replace FBS in culturing many human cell lines have provided new evidence to develop new usages of royal jelly.