

Silk-Gland-Derived Sericin as a Growth Promoter in Animal Cell Culture

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Sericin is a protein found in silk produced by the silkworm (*Bombyx mori*) that may be useful as a growth promoter in cultured animal cells. Existing extraction methods require thermal denaturation to separate sericin from the cocoon (cocoon-sericin), but this results in some loss of sericin functionality. I have developed an improved extraction method to obtain sericin from the silk glands (gland-sericin) of last instar *Bombyx mori* larvae without heating. In addition, the function of the extracted sericin as an animal cell growth promoter was also evaluated. Liquid sericin stored in the silk glands was successfully dissolved in sodium bicarbonate without heating and purified by dialysis. After drying, the gland-sericin solution became a flexible film that could readily be used in cell culture. Examination of the secondary structure using infrared spectroscopy showed that gland-sericin proteins were mostly alpha helix structures. Comparative experiments were performed to examine the effect of the extraction method on cell growth by investigating the proliferation of Normal Human Dermal Fibroblasts in each sericin coating. After 120 hours, the results showed that the increase in cell number due to gland-sericin was approximately 1.4-fold higher than that due to cocoon-sericin. Therefore, the new method provides better cell growth than the widely used collagen-coating method. In conclusion, silk gland sericin extracted using this new method performs better as a cell growth promoter than cocoon-sericin. This study demonstrated that gland-sericin can be used as a new and efficient base material in animal cell culture.

Awards Won:

Second Award of \$2,000