Silk can be defined as protein polymers spun in fibers by arthropods, mainly spiders and lepidopterans. Silk thread is generally reeled from silkworm cocoons, spun by insects for pupation. It finds a wide application in the textile industry. In India, sericulture and chiefly cultivation of *Antheraea mylitta*, the Indian tropical tasar non-mulberry silkworm, is a major source of livelihood for a large number of people. Associated with traditional ceremonial rites, silk is commonly regarded as a "queen of fabrics". Fibroin protein is a chief constituent of silk cocoons and is a hydrophobic glycoprotein. A mere cosmetic utilization of silk does not completely utilize the remarkable properties possessed by *A. mylitta* silk fibroin protein. Silk fibroin sutures from *Bombyx mori*, a domesticated mulberry silkworm, have been extensively used in surgery. In our study, we have utilized *A. mylitta* fibroin for the fabrication of films to support adhesion, proliferation and viability of cells *in vitro* to aid tissue repair processes. *A. mylitta* fibroin possesses physico-chemical properties far superior to that of *B. mori* fibroin like mechanical strength, hydrophobicity, water retention, and even in terms of cell culture applications, *A. mylitta* fibroin scores over *B. mori* fibroin.

In the pure form, *A. mylitta* fibroin protein films elicited minimal inflammatory reaction of macrophages and showed no cytotoxicity when fibroblasts were seeded. Cellularization rate was higher than even collagen films. On blending with polymers, this protein showed greater thermostability and showed highest metabolic activity of human osteoblast cell lines and also showed mineralization activity comparable to polystyrene matrices. In terms of designing a biomaterial with enhanced adhesion properties, *B. mori* fibroin was conjugated with an oligosaccharide like α- lactose and this matrix prevented hypertrophic scar formation in superficial and full-thickness skin burn injuries.

This work is a humble effort to establish *Antheraea mylitta* fibroin protein as a biomaterial and to pave the way for formulation of future biomaterial aids like scaffolds, hydrogels and electrospun matrices. Lactose conjugation and other similar conjugation experiments could be used in future to boost adhesion potential of most biomaterial matrices as performed with *Bombyx mori* fibroin.

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