

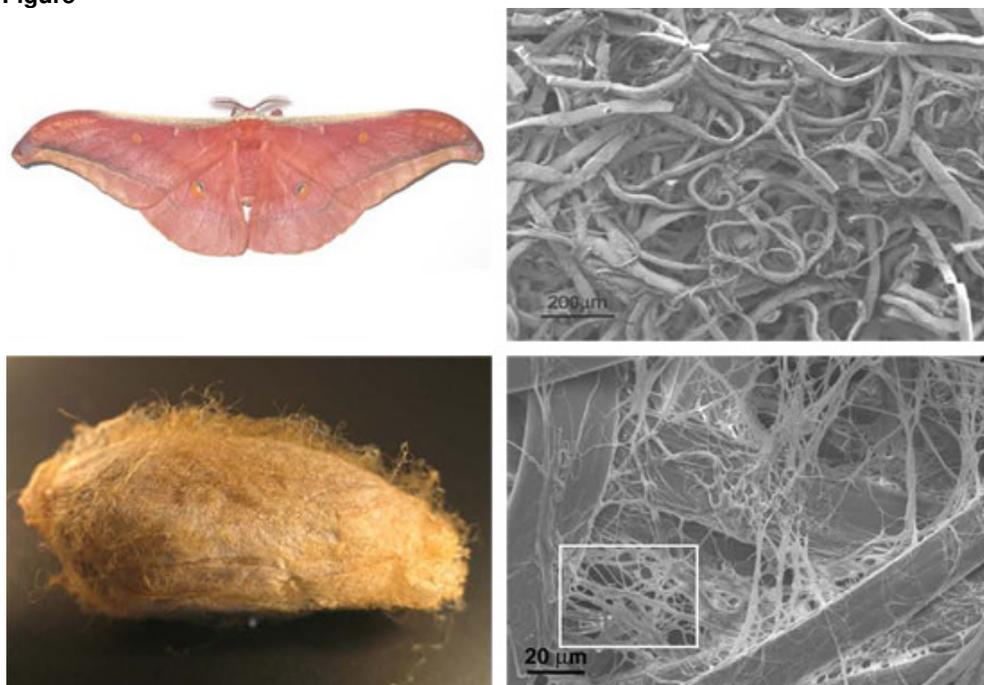
Golden Biomaterial for Tissue Engineering Applications

Silk proteins have been well known to the textile industries for centuries and to doctors as sutures for decades. Silk is a biopolymer, synthesized in the epithelial cells of specialized glands, secreted into the lumen and finally spun into fibres by several Lepidopteran larvae. The spun fibre is built from a central protein, fibroin, encased with a glue-like coating composed of another protein, sericin. Until recently, reported studies exploited fibroin from the domesticated mulberry silkworm *Bombyx mori*. Although the natural function of all fibroins is similar, these are not very conserved at the sequence level. From biomaterials standpoint, the structural differences due to primary amino acid sequence, processing and the effect of environmental factors result in functional differences among fibroins of different species or within a species.

Recently, a new variety of silk fibroin has been reported by *Kasoju et al*, where they have exploited the fibroin from *Antheraea assama* silk worm for tissue engineering applications. The fibroin was purified from cocoons and subsequently fabricated into three dimensional scaffolds for use in tissue engineering. The scaffolds were designed to possess a biomimetic architecture composed of micro fibrous, nano fibrous and a combination of both. The material was found to possess superior physico - chemical, thermal and mechanical properties compared to mulberry silk worm *B. mori*. It has been established that the material was compatible with blood and cells. The amenability for biodegradation has also been established. Further, the scaffolds were found to be supportive of angiogenesis.

A. assama is a semi-domesticated, multivoltine, non-mulberry, wild, sericigenous species belonging to the family Saturniidae (superfamily Bombycoidea). These silkworms are raised outdoors primarily on aromatic leaves of Som (*Machilus bombycina*) and Soalu (*Litsaea polyantha*). By virtue of the narrow ecological distribution of the host food plant, *A. assama* is confined only to the north eastern region of India, especially Assam state, hence the name 'assama'. *A. assama* is popularly known as 'muga', an Assamese word that indicates the rich amber brown (golden) colour of silk fibre, and is of much commercial value in textile industries in India. The silk fibroin from golden silk *A. assama* would gain attention of many researchers due to its superior features over conventionally used mulberry silk fibroin, for exploitation in tissue engineering and various other biomedical applications.

Figure



The figure shows the *A. assama* silk moth, the raw cocoon and morphology of three dimensional biomimetic scaffolds fabricated using the purified fibroin from cocoon.

References

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