Why Spider Silk?
Spider silk has a vast number of potential applications, including textiles and biomaterials. Its incredible strength (stronger by weight than steel) and remarkable toughness make spider silk a very desirable material with which to produce high-strength fabrics and cords. Figure 1 compares the mechanical properties of spider silk to those of other materials. The biocompatibility of spider silk make it a great compound with which to make biomaterials that will not react or be rejected.

Spider Silk and e.Coli
Spiders are cannibalistic, making them difficult to farm, they also produce inconsistent fibers when raised in captivity, making them less than ideal for mass production of silks. Escherichia coli is widely-used for recombinant expression of silk proteins[5]. E. coli is easy to genetically modify and is easily grown at a variety of scales, two qualities that make it a very effective platform for recombinant expression.

Methods
Each of the five chaperon protein plasmids shown in figure 3 were transformed into chemically competent BL21 strain e. Coli cells. These transformed cells were cultured and made chemically competent using a transformation buffer, then cotransformed with the Masp2(8) spider silk protein vector. Cultures were grown and harvested, with samples collected pre-centrifugation, and from both the solid and liquid phases post-centrifugation. Samples were run on a protein gel, and a western blot was performed to test for the presence of the protein of interest.

Results
As can be seen in Figure 2, no protein of interest is visible in any of the soluble phase wells. This indicates that the cotransformation of chaperone proteins did not increase the purification solubility of spider silk proteins in this trial. Recombinant spider silk proteins are very insoluble, and more research is needed in order to improve solubility.

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