CLAIMS

WHAT IS CLAIMED IS:

1. A plant cell, wherein the plant cell comprises:

a vector comprising:

(i) a polynucleotide sequence encoding for a heterologous protease inhibitor or a functional variant thereof; and

(ii) a polynucleotide sequence encoding for a mammalian protein or a functional variant thereof,

wherein the mammalian protein is a mammalian growth factor protein selected from the group consisting of mammalian fibroblast growth factor 2 (FGF-2), mammalian insulin-like growth factor 1 (IGF-1), and mammalian vascular endothelial growth factor (VEGF).

2. The plant cell of claim 1, wherein the heterologous protease inhibitor is SICYS8.

3. The plant cell of claim 1, wherein the vector is:

(i) a viral vector; or

(ii) a bacterial vector.

4. The plant cell of claim 1, wherein the vector is Tobacco mosaic virus.

5. The plant cell of claim 1, wherein the vector is an *Agrobacterium* species.

6. The plant cell of claim 1, wherein the plant cell is a tobacco plant cell.

7. The plant cell of claim 6, wherein the tobacco plant cell is an *Nicotiana benthamiana* cell.

8. The plant cell of claim 1, wherein the mammalian protein is the mammalian FGF-2, and wherein the mammalian FGF-2 is human FGF-2 or bovine FGF-2.

9. The plant cell of claim 8, wherein the polynucleotide sequence encoding for the human FGF-2 comprises a sequence with at least 75% sequence identity to SEQ ID NOs: 23, 24, 25, 26, or 28.

10. The plant cell of claim 8, wherein the human FGF-2 comprises a polypeptide sequence selected from the group consisting of SEQ ID NOs: 1, 2, 3, 4, 5, 6, and 14.

11. The plant cell of claim 8, wherein the bovine FGF-2 comprises a polypeptide sequence of SEQ ID NO: 15.

12. The plant cell of claim 1, wherein the mammalian protein is mammalian IGF-1.

13. The plant cell of claim 12, wherein the mammalian IGF-1 comprises a polypeptide sequence of SEQ ID NO: 12 or SEQ ID NO: 13.

14. The plant cell of claim 1, wherein the mammalian protein is mammalian VEGF.

15. The plant cell of claim 1, wherein the mammalian VEGF comprises a polypeptide sequence of SEQ ID NO: 20.

16. A method of manufacturing a mammalian protein, comprising:

(i) culturing a plurality of plant cells , each of the plurality of plant cells comprising a vector comprising:

(a) a polynucleotide sequence encoding for a heterologous protease inhibitor or a functional variant thereof, and

(b) a polynucleotide sequence encoding for a mammalian protein or a functional variant thereof; and

(ii) extracting soluble proteins from a harvested plurality of plant cells, thereby generating an extraction product comprising the mammalian protein or a functional variant thereof, wherein the mammalian protein is a mammalian growth factor protein selected from the group consisting of mammalian fibroblast growth factor 2 (FGF-2), mammalian insulin-like growth factor 1 (IGF-1), and mammalian vascular endothelial growth factor (VEGF).

17. The method of claim 16, further comprising: prior to and/or during (i), infiltrating the vector into another plurality of plant cells, thereby forming the plurality of plant cells.

18. The method of claim 17, wherein the infiltrating is vacuum infiltrating.

19. The method of claim 16, wherein the mammalian protein is human FGF-2, bovine FGF-2, bovine IGF-1, or human VEGF.

20. The method of claim 16, wherein the mammalian protein is histidine-tagged, and wherein the extracting comprises using metal-based histidine-tag affinity (NTA) magnetic beads.