

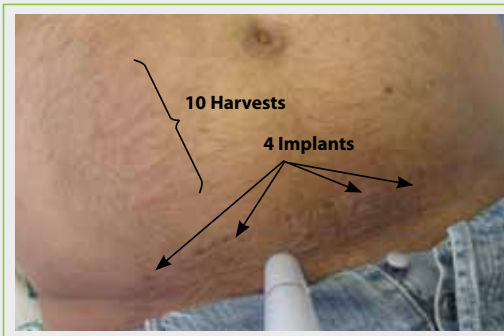
# Biopump Technology

Biopump offers a sustained, safe, natural protein therapeutic alternative to scores of frequent injections. A toothpick sized sliver of dermis tissue, taken by needle biopsy under local anesthetic, is processed outside the patient to become a protein production unit within 2 weeks. One or more Biopumps are injected to deliver desired dose for months.

1. Harvest the tissue by needle biopsy from under patients skin.
2. Make tissue into a drug producing Biopump by controlled transfer of desired gene.
3. Measure each Biopump's drug production level and estimate number of Biopumps required.
4. Implant required number of Biopumps under patient's skin



Micro-organ and a toothpick



## Potential Competitive Advantages

### Increased efficacy

- Constant drug release avoids underdose periods between injections
- Dose within therapeutic window

### Improved safety

- Patient produced protein – truly personalized medicine
- Avoids side effects of overdose each injection

### Improved patient compliance

- “plug and play” delivers without patient bother

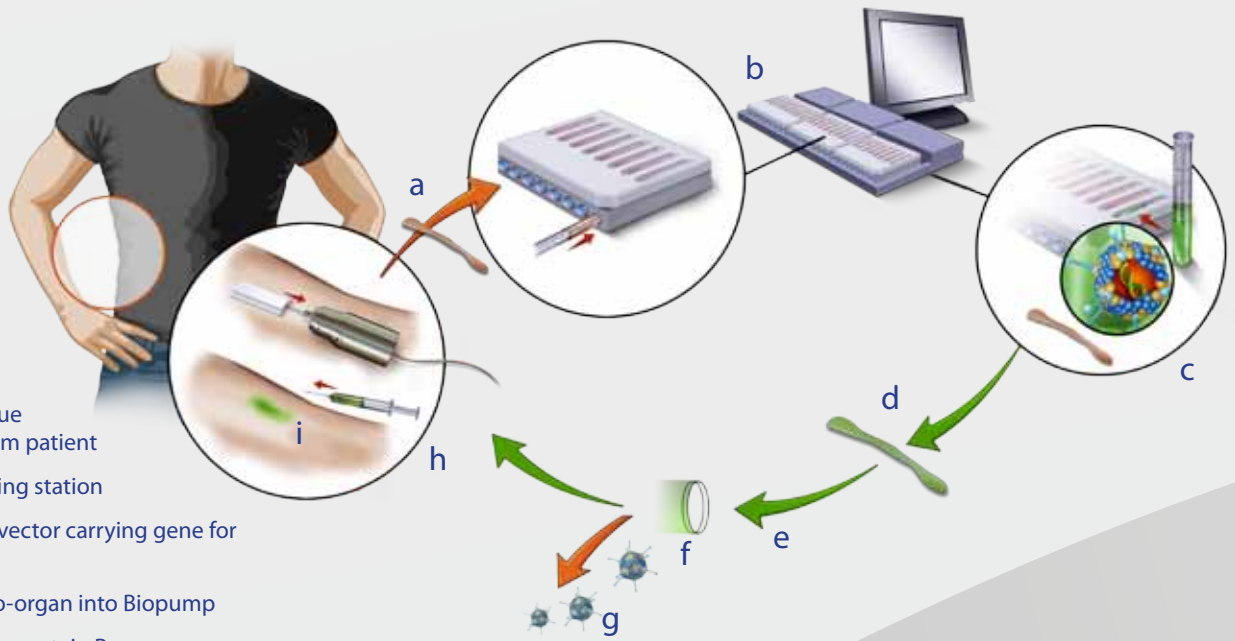
### Reduced costs

- Lower production cost
- Two visit treatment per year vs daily/weekly injections

## Development Pipeline

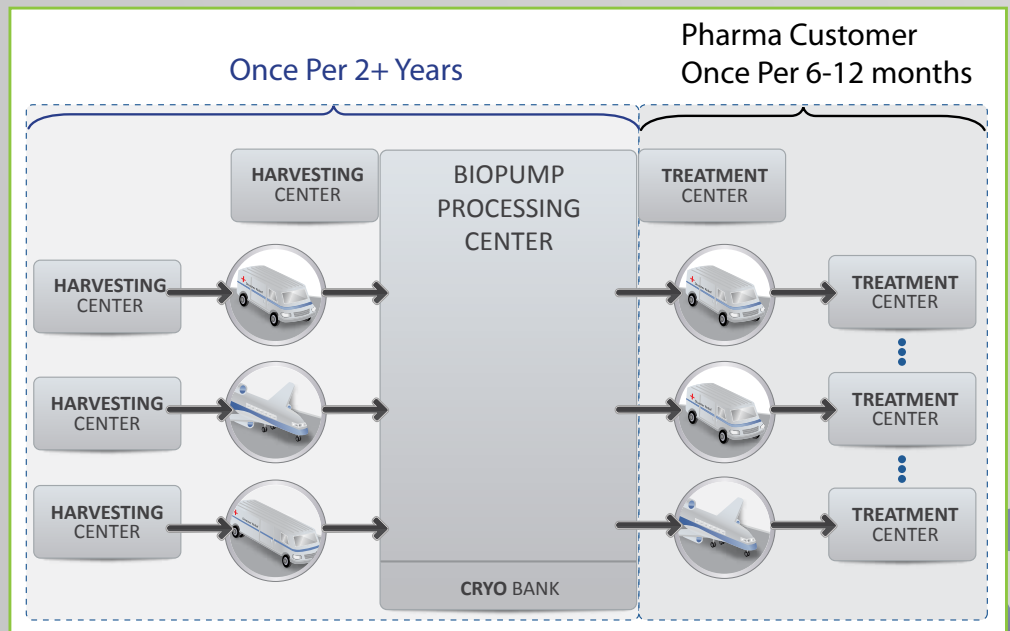
Condition	Protein	Development Stage	Market Size (\$Bn)
Anaemia	Erythropoetin	Phase I/II	12.0
Hepatitis C	Interferon Alpha	Preclinical	3.5
Haemophilia	Factor VIII	In Preclinical Co-Development	3.6
Growth Failure	Growth hormone	Future Candidate	2.8
Multiple Sclerosis	Interferon Beta	Future Candidate	5.2
Diabetes	Insulin	Future Candidate	11.2
Arthritis	IL-1Ra	Future Candidate	12.9
Wound Healing	PDGF-BB	Future Candidate	NA
Obesity	Peptide YY3-36	Future Candidate	NA
Chronic Pain	IL-10	Future Candidate	NA
Cancer Recovery	G-CSF	Future Candidate	4.8

# Biopump Therapeutic Implementation



- a** – Harvest dermis tissue (“micro-organs”) from patient
- b** – Transfer to processing station
- c** – Adenoviral gutless vector carrying gene for desired protein
- d** – Process each micro-organism into Biopump
- e** – Biopump producing protein P
- f** – Measure daily protein production per Biopump for dosing
- g** – Wash several days to remove vector
- h** – Re-implant Biopumps subcutaneously per dosing
- i** – Sustained local delivery of protein for life of cells in Biopump (> 6 months)

## Typical Regional Center Concept



**Medgenics**  
healing from within

### Israel

Teradion Business Park  
P.O. Box 14  
Migav 20179 Israel

Phone: +972.4.902.8900  
Fax: +972.4.999.0114

[www.medgenics.com](http://www.medgenics.com)

### U.S.A.

8000 Towers Crescent Dr.  
Suite 1300  
Vienna, Va. 22182 U.S.A.

Phone: 646.239.1690  
Fax: 703.288.0070

[info@medgenics.com](mailto:info@medgenics.com)