Applications of Gene Cloning

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Genome Sequencing and studying Human genes
Golden Rice
Vitamin C

Citrus fruits, green peppers, strawberries, tomatoes, broccoli and sweet and white potatoes are all excellent food sources of vitamin C (ascorbic acid).

Vitamin C promotes a healthy immune system, helps wounds heal, maintains blood vessels and connective tissue and aids in the absorption of iron.

RDA: 60 mg
Water-soluble
Salty Soil

Arabidopsis thaliana

4XSalt
Friendly Insecticides

*Bacillus thuringiensis* bacteria produce a protein toxin that kills insect larvae pests and is 80,000 times more toxic than the typical chemical insecticide.
Resistant to Herbicides

Glyphosate Roundup

(corn, cotton, soybeans)
Synthetic Insulin

DNA extracted and cut into fragments

one fragment containing the gene is removed and inserted into the DNA of bacterial cells

bacterial replicate in laboratory cultures, copying the human gene and making its protein

protein coded for by the gene is extracted from bacterial cells

protein extracted from milk for therapeutic use

gene therapy
Spider Silk

5X stronger than steel
DNA Vaccine
One Vaccine Many Diseases
<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>USE</th>
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<tbody>
<tr>
<td>Colony-stimulating factor</td>
<td>Stimulates production of white blood cells in patients with cancer and AIDS</td>
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<td>Erythropoietin</td>
<td>Prevents anemia in patients undergoing kidney dialysis and cancer therapy</td>
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<td>Factor VIII</td>
<td>Replaces clotting factor missing in patients with hemophilia A</td>
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<td>Growth hormone</td>
<td>Replaces missing hormone in people of short stature</td>
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<tr>
<td>Insulin</td>
<td>Stimulates glucose uptake from blood in people with insulin-dependent (Type I) diabetes</td>
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<tr>
<td>Platelet-derived growth factor</td>
<td>Stimulates wound healing</td>
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<td>Tissue plasminogen activator</td>
<td>Dissolves blood clots after heart attacks and strokes</td>
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<td>Vaccine proteins: Hepatitis B, herpes, influenza, Lyme disease, meningitis, pertussis, etc.</td>
<td>Prevent and treat infectious diseases</td>
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If we knew what it was we were doing, it would not be called research, would it?" - Albert Einstein