# Can Tobacco Cure Ebola – Cutting Edge Drugs from Plants

We recently wrote about the **potential economic devastation of the Ebola virus**. Now we see an investment opportunity tied to the treatment of this terrible disease and other ailments. A recent article in online Bloomberg notes the use of an**Ebola Tobacco drug** that appears to have been successful in treating two Americans infected by the virus.

*On a small plot of land incongruously tucked amid a Kentucky industrial park sit five weather-beaten greenhouses. At the site, tobacco plants contain one of the most promising hopes for developing an effective treatment for the deadly Ebola virus.*

*The plants contain designer antibodies developed by San Diego-based Mapp Biopharmaceutical Inc. and are grown in Kentucky by a unit of Reynolds American Inc. (RAI) Two stricken U.S. health workers received an experimental treatment containing the antibodies in Liberia last week. Since receiving doses of the drug, both patients' conditions have improved.*

Scientists are inserting genes in plants such as lettuce, carrots and duckweed in attempts to derive treatments for diseases such as rabies and pandemic flu.

**Directing the Resources of Nature**

Years ago diabetics were treated with insulin derived from pigs. Today diabetics receive human insulin that is secreted by genetically modified bacteria. Sold under the trade name **Humunlin**, human insulin is produced by Escherichia coli bacteria that have been genetically altered with recombinant DNA to make this medicine.

*Humulin is synthesized in a laboratory strain of Escherichia coli bacteria which has been genetically altered with recombinant DNA to produce biosynthetic human insulin. Humulin R consists of zinc-insulin crystals dissolved in a clear fluid. The synthesized insulin is then combined with other compounds or types of insulin which affect its shelf life and absorption. For example, Humulin N is combined with protamine to extend the time-activity profile of Humulin R for an extended period.*

The use of plants to produce cutting edge drugs is simply another step in the process of using the tools of nature to benefit humankind and gain a profit at the same time.

**Investing in Biotech**

Can a tobacco-derived medication cure Ebola? What cutting edge drugs will emerge from a head of lettuce or carrot? Investing in biotech can be very profitable but it can also require a lot or insight, homework and time. The timeline for bringing a plant-derived drug to market goes like this:

- Inject a gene into a plant
- Grow the plant and extract the medication
- Develop a process to reliably produce a pure form of the medication
- Test the drug on animals
  - Test for effectiveness
  - Test for side effects
- Obtain permission for FDA trials on humans
- Undergo FDA trials
  - Phase 1: Test in a few healthy volunteers to find out if it is acutely toxic.
  - Phase 2: Give a range of doses to a number of patients to determine dosing regime
  - Phase 3: Double-blind, placebo controlled trials to demonstrate effectiveness. This stage can take a long time and be very expensive.
  - (Phase 4): Post-approval trials that are sometimes required for FDA approval.

At any step along the way the results to see if a tobacco derived drug can cure Ebola virus could show great results or it could fail. The companies that have invested in developing such cures will see their stock prices rise and fall according to published results of their studies. If these are large companies the stock price change will be small and if they are new startup companies the changes will be huge. The best results are obviously obtained by spotting a small publically traded company with a great idea and getting in before the rest of the world catches on. It is also often a good idea to take a little profit along the way when the drug in question passes one of the hurdles for FDA approval as it might fail the next time and take the stock price down with it.

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