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Human Acetylcholinesterase Isoforms and Butyrylcholinesterase from Transgenic Plants

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Inventors

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Invention Description

Despite the promise of cholinesterases as effective treatments against nerve-agent intoxication, the practicality of this therapeutic approach depends on the availability of large amounts of these enzymes. Furthermore, these enzymes are required in stoichiometric rather than catalytic quantities.

The present invention is a method of making a transgenic plant that is capable of expressing a physiologically active human acetylcholinesterase (AChE), human butyrylcholinesterase (BuChE) or their derivatives. It is a robust system that is capable of production and delivery of effective countermeasures against pesticides and non-conventional warfare agents. ASU researchers have identified that a more efficient and less costly enzyme source is greatly needed; thus, they have dedicated their work to increasing the yield and purity of the enzymes produced in transgenic plants by increasing the levels of expression of the enzymes in plants. This is done so by optimizing the expression constructs that encode them for expression in plants.

Potential Applications

The market for the plant-production of enzymes is poised to grow rapidly, fueled by the need for a reliable, safe, non-supply limited and inexpensive source of ChEs, and the emergence of other transgenic plant technologies.

- Prophylaxis for anticipated exposure
- Post-exposure treatment of victims
- Topical skin protectants
- Personal and large filtering devices
- Decontamination of equipment and buildings

Benefits and Advantages

The transgenic plant offers:

- **Quality** – enzymes produced are fully equivalent to enzymes derived from other sources
- **Improved safety** – no concerns of human pathogen and prion contamination
- **Scalability** – rapid, extremely large scale-up is possible with this technology
- **Production flexibility with low capital investment** – large stockpiles of transgenic seeds can be produced and stored in disperse locations

Intellectual Property Status:

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