

CLARENCE, N.Y.--([BUSINESS WIRE](#))--22nd Century Group, Inc. (OTCQB: [XXII](#)) announced today that the United States Patent and Trademark Office (USPTO) has issued a Notice of Allowance for tobacco plants with altered nicotine content developed by using nucleic acids derived from a transcription factor gene identified as NbTF7 – also known as NbARF1. NbTF7 simultaneously regulates the expression of multiple nicotine biosynthesis genes.

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The allowed claims of Patent Application No. 13/464,212, entitled, *NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM*, cover producing tobacco plants with altered nicotine levels by mutagenesis of the transcription factor gene NbTF7 that negatively regulates nicotine biosynthesis. NbTF7 is one of six tobacco transcription factor genes identified and demonstrated to regulate nicotine biosynthesis and nicotine content in tobacco plants in International Patent Application PCT/IB2008/003131, from which United States Patent Application No. 13/464,212 and other related patent applications are derived.

These patent applications include claims for (i) nucleic acids which encode each of six transcription factor genes that either positively or negatively regulate multiple nicotine biosynthesis genes, (ii) methods for producing tobacco plants with altered nicotine levels by up-regulating or down-regulating expression of the six transcription factor genes, and (iii) tobacco cells, tobacco plants, and tobacco products produced by using these methods. The major advantage of 22nd Century’s transcription factor technology is that multiple nicotine biosynthesis genes can be down-regulated to produce very low nicotine tobacco or up-regulated to produce high nicotine tobacco by modifying a single transcription factor gene.

This technology can be implemented, as specified in the claims allowed in Patent Application No. 13/464,212, so that no foreign genes to the tobacco plant are present in the resulting tobacco. Such plants are not considered to be genetically modified in the United States and certain other countries.

The Notice of Allowance for regulating transcription factor gene NbTF7 was issued on September 6, 2013 to the National Research Council Canada (NRC). Dr. Jonathon Page and Andrea T. Todd of the NRC Plant Biotechnology Institute are the inventors. 22nd Century funded research and development at NRC thereby becoming NRC's exclusive worldwide licensee of this transcription factor technology and other technologies. 22nd Century is further developing the technology, including producing novel commercial tobacco plant varieties. The patent will be issued by the USPTO within the next few months and will expire in 2028.

The transcription factor technology is one of several 22nd Century patent families representing the company's second-generation gene technology for modifying the content of nicotine and other nicotinic alkaloids in the tobacco plant. 22nd Century's Vice President of Research and Development, Dr. Michael Moynihan stated, "We are very pleased that the USPTO has allowed this patent. Our second-generation technology has significant advantages over our first generation technology."

In the United States, 22nd Century has a patent portfolio of 16 issued patents and 8 pending patent applications – mainly related to the key nicotine biosynthesis genes and transcription factors that regulate the expression of these genes, and tobacco harm reduction products produced therefrom. 22nd Century's technology allows for the production of the world's lowest nicotine cigarette, up to 98% less nicotine than that of "light" cigarettes, and world's lowest tar-to-nicotine ratio cigarette.

About 22nd Century Group, Inc.

22nd Century is a plant biotechnology company whose proprietary technology allows for the levels of nicotine and other nicotinic alkaloids (e.g., nornicotine, anatabine and anabasine) in the tobacco plant to be decreased or increased through genetic engineering or plant breeding. 22nd Century owns or is the exclusive licensee of 112 issued patents in 78 countries plus an additional 38 pending patent applications. Goodrich Tobacco Company, LLC and Hercules Pharmaceuticals, LLC are wholly-owned subsidiaries of 22nd Century. Goodrich Tobacco is focused on commercial tobacco products and tobacco harm reduction products in development. Hercules Pharmaceuticals is focused on X-22, a prescription smoking cessation aid in development.

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