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22nd Century Group Announces Allowance of U.S. Patent For Regulating Nicotine in Tobacco Using Transcription Factor Gene

CLARENCE, N.Y.--(BUSINESS WIRE)--

22nd Century Group, Inc. (NYSE MKT:[XXII](#)) announced today that the United States Patent and Trademark Office (USPTO) has issued a Notice of Allowance for technology that decreases or increases nicotine production and levels in tobacco plants 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.

The transcription factor technology is one of several 22nd Century patent families representing the company's second-generation 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. Modification of transcription factor expression provides a means of regulating the entire nicotine pathway. We believe there will be tremendous commercial opportunities for both our very low nicotine and our higher nicotine tobacco varieties."

The allowed claims of Patent Application No. 12/601,752, entitled, *NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM*, cover methods of producing tobacco and tobacco cells with altered nicotine levels. *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. 12/601,752 and other related patents and patent applications are derived.

This patent family includes 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 (VLN) tobacco or up-regulated to produce high nicotine tobacco by modifying a single transcription factor gene. This technology may be implemented, as specified in the claims allowed in U.S. Patent Number 8,624,083, so that no foreign genes to the tobacco plant are present in the resulting tobacco. Accordingly, 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 June 16, 2014 to the National Research Council Canada (NRC). Dr. Jonathon Page and Andrea T. Todd 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. Patent Application No. 12/601,752 will be granted by the USPTO shortly and will expire in 2028.

In the United States, 22nd Century has a patent portfolio of 17 issued patents and 13 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 a wide spectrum of higher nicotine tobacco as well. The resulting tobacco plants are planted, grown, harvested, cured, processed, and made into tobacco products exactly the same as traditional tobacco.

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 and plant breeding. 22nd Century owns or is the exclusive licensee of 117 issued patents in 78 countries plus an additional 44 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 potentially less harmful cigarettes. Hercules Pharmaceuticals is focused on X-22, a prescription smoking cessation aid in development.

For additional information, please visit: www.xxiicentury.com

Cautionary Note Regarding Forward-Looking Statements: This press release contains forward-looking information, including all statements that are not statements of historical fact regarding the intent, belief or current expectations of 22nd Century Group, Inc., its directors or its officers with respect to the contents of this press release. The words “may,” “would,” “will,” “expect,” “estimate,” “anticipate,” “believe,” “intend” and similar expressions and variations thereof are intended to identify forward-looking statements. We cannot guarantee future results, levels of activity or performance. You should not place undue reliance on these forward-looking statements, which speak only as of the date that they were made. These cautionary statements should be considered with any written or oral forward-looking statements that we may issue in the future. Except as required by applicable law, including the securities laws of the United States, we do not intend to update any of the forward-looking statements to conform these statements to reflect actual results, later events or circumstances, or to reflect the occurrence of unanticipated events. You should carefully review and consider the various disclosures made by us in our annual report on Form 10-K for the fiscal year ended December 31, 2013, filed on January 30, 2014, including the section entitled “Risk Factors,” and our other reports filed with the U.S. Securities and Exchange Commission which attempt to advise interested parties of the risks and factors that may affect our business, financial condition, results of operation and cash flows. If one or more of these risks or uncertainties materialize, or if the underlying assumptions prove incorrect, our actual results may vary materially from those expected or projected.

Redington, Inc.
Tom Redington, 203-222-7399

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