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22nd Century Announces Exclusive Worldwide Agreement with KeyGene for Genetic Development of Hemp/Cannabis

Strategic collaboration will bolster 22nd Century's position as a global leader in hemp/cannabis genetics.

WILLIAMSVILLE, N.Y.--(BUSINESS WIRE)-- 22nd Century Group, Inc. (NYSE American: [XXII](#)), a plant biotechnology company that is a leader in tobacco harm reduction, Very Low Nicotine Content tobacco, and hemp/cannabis research, announced today that the Company has entered into a worldwide strategic research and development agreement with KeyGene, www.keygene.com, a global leader in plant research involving high-value genetic traits and increased crop yields. This exclusive, worldwide collaboration will focus on developing hemp/cannabis plants with exceptional cannabinoid profiles for medical and therapeutic use among other applications.

Cannabinoids are naturally occurring compounds found in hemp and in cannabis that have been linked to a number of potential medical benefits. The mix, concentration, and characteristics of these cannabinoids vary widely and can be optimized through molecular breeding and other modern crop improvement technologies that have been utilized extensively in other crops, but which have been utilized rarely in hemp and cannabis varieties.

The 22nd Century-KeyGene collaboration provides 22nd Century access to a unique suite of crop innovation platforms, including genomics, molecular genetics, trait discovery and breeding technologies. Under the agreement, 22nd Century will hold exclusive worldwide rights to all hemp/cannabis plant lines, intellectual property on metabolic traits, and research results that are developed through this strategic partnership. The focus of the collaboration will include:

- (i) Creating a cutting-edge genetic database which utilizes the results of genomic analyses of several hundred existing, exceptional hemp/cannabis plant lines for use in the acceleration of the Company's development and licensing of uniquely characterized and improved hemp/cannabis plants;
- (ii) Enhancing genetic variation to empower 22nd Century's development of new and significantly improved varieties of hemp/cannabis plant lines and varieties with highly desirable cannabinoid profiles optimized for medicinal or therapeutic applications;
- (iii) Creating a proprietary and industry-leading high-resolution "molecular genetic map" of the entire cannabis plant genome to facilitate rapid, cost-effective breeding of innovative varieties of hemp/cannabis plants with distinctive agronomic traits;
- (iv) Analyzing the genomic sequences of multiple species of the hemp/cannabis plant and identifying shared genetic markers, allowing 22nd Century to develop improved commercial hemp/cannabis plant lines more rapidly than through conventional plant breeding approaches; and
- (v) Initiating the rapid-cycle generation of hemp/cannabis plant lines with distinctive cannabinoid and terpene profiles to create elite lines.

"22nd Century's exclusive global collaboration with KeyGene is expected to yield truly remarkable and novel medicinal cannabinoid profiles and other highly desirable agronomic traits," explained Henry Sicignano III, President and Chief Executive Officer of 22nd Century Group. "Combined with 22nd Century's existing hemp/cannabis technology, including our existing proprietary hemp/cannabis plant lines, the KeyGene program will bolster 22nd Century's position as a global leader in hemp/cannabis genetics and, we expect, will lead to significant commercialization ventures and other opportunities."

"22nd Century's work with KeyGene will greatly enhance our Company's ability to utilize the cannabis genome and will enable us to accelerate molecular breeding of new hemp/cannabis plant varieties," said Dr. Juan

Tamburrino, 22nd Century's Vice President of Research and Development. "We believe our collaboration with KeyGene will generate proprietary knowledge and will contribute greatly to our intellectual property and patent portfolio."

Work on the program will occur in multiple locations in the United States and the Netherlands.

About 22nd Century Group, Inc.

22nd Century is a plant biotechnology company focused on technology which allows it to increase or decrease the level of nicotine in tobacco plants and the level of cannabinoids in hemp/cannabis plants through genetic engineering and plant breeding. The Company's primary mission in tobacco is to reduce the harm caused by smoking. The Company's primary mission in hemp/cannabis is to develop proprietary hemp strains for important new medicines and agricultural crops. Visit www.xxiiicentury.com and www.botanicalgenetics.com for more information.

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, including but not limited to our future revenue expectations. 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, 2018, filed on March 6, 2019, 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.

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