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Amarantus Announces Publication of a Clinical Study of MSPrecise(R) Diagnostic for Identification of Relapsing-Remitting Multiple Sclerosis (RRMS) in the Journal GENE

- *MSPrecise next generation sequencing assay supports identification of multiple sclerosis patients with 84% accuracy -*

- *Results from this study were not combined with oligoclonal banding (OCB) -*



- *MSPrecise performs well in identifying MS among a broad cohort of potential neurological diseases -*

SAN FRANCISCO and GENEVA, July 29, 2015 (GLOBE NEWSWIRE) -- [Amarantus Diagnostics](#), a neurology-focused diagnostics company developing diagnostic tests for multiple sclerosis and Alzheimer's disease and a wholly-owned subsidiary of [Amarantus Bioscience Holdings, Inc.](#) (OTCQX:AMBS), announced the publication of data on its next generation sequencing (NGS) molecular diagnostic test for multiple sclerosis, MSPrecise®. The paper entitled, "[MSPrecise: A molecular diagnostic test for multiple sclerosis using next generation sequencing](#)," has been published in the Elsevier journal [GENE](#).

MSPrecise is a proprietary next-generation DNA sequencing (NGS) assay for the identification of patients with relapsing-remitting multiple sclerosis (RRMS). MSPrecise utilizes next-generation sequencing to measure DNA mutations found in rearranged immunoglobulin genes in immune cells isolated from cerebrospinal fluid. A blood based version of the test is in development.

"Given the early misdiagnoses that often occur with multiple sclerosis, physicians have an increasing need for new methods to accurately diagnose their patients," said Colin Bier, Chief Development Officer of Amaranthus Diagnostics. "MSPrecise scoring is a powerful approach to aid clinicians in this task. In this study completed in 2013 and now reported in 'GENE,' there is an overall MSPrecise accuracy of 84% in identifying RRMS patients or patients that will develop RRMS, which represents a huge benefit to physicians. In early 2015, Amaranthus reported data from a later study that showed a significant increase in the accuracy of MSPrecise when adding oligoclonal banding (OCB) to the algorithm. We intend to publish those data combining MSPrecise and OCB in the near future."

Previous studies demonstrated that cerebrospinal fluid-derived (CSF) B cells from early relapsing-remitting multiple sclerosis (RRMS) patients that express a VH4 gene accumulate specific replacement mutations that can be quantified as a score that identifies such patients as having or likely to convert to RRMS. Next-generation sequencing is an efficient method to obtain the sequencing information required by this mutation scoring tool, originally developed using the less clinically viable single-cell Sanger sequencing. The clinical study detailed in this publication was conducted analyzing the VH4 antibody gene repertoires in CSF cell pellets to determine the accuracy of the MSPrecise diagnostic test in identifying the presence of the RRMS-enriched mutation pattern from patient cerebrospinal fluid B cells.

In this study, cerebrospinal fluid cell pellets were obtained from 26 patients with other neurological disease (OND) and 13 patients with confirmed RRMS using next generation sequencing. VH4 gene segments were amplified, sequenced by next generation sequencing, and analyzed for mutation score. The results of the diagnostic testing with MSPrecise showed a sensitivity of 75% on the RRMS cohort and a specificity of 88% on the OND cohort. The study confirmed an 84% accuracy of MSPrecise in identifying RRMS patients or patients that will develop RRMS. MSPrecise exhibits good performance in identifying patients with RRMS irrespective of the time a patient exhibited RRMS.

Gerald E. Commissiong, President & CEO of Amaranthus Bioscience Holdings, added, "Our immediate focus is to conduct a CLIA-validation study in order to make the test commercially available, and plans are being finalized in this regard. We also plan to conduct future investigational studies to determine whether MSPrecise scoring using NGS platforms may be utilized to identify clinically isolated syndrome (CIS) patients who will convert to RRMS. Additionally, a more expansive clinical study with a larger patient cohort including several sub-cohorts of RRMS patients on disease modifying therapies and OND patients is also planned."

For online access to the abstract, "*MSPrecise: A molecular diagnostic test for multiple sclerosis using next generation sequencing*," please click <http://www.ncbi.nlm.nih.gov/pubmed/26172868>.

A recent article published in *The Guardian* titled, "*MS: four in five multiple sclerosis sufferers in UK are misdiagnosed*," describes the critical unmet need of accurate and efficient MS diagnosis. In the survey of over 1,000 MS patients, 81% reported that they had at least once been misdiagnosed, with over 39% of sufferers waiting more than a year for an accurate diagnosis. A link to the article can be found here: <http://www.theguardian.com/society/2015/may/27/four-in-five-multiple-sclerosis-sufferers-in-uk-are-misdiagnosed>.

There are approximately 2.5 million MS patients worldwide that are currently being treated with over \$14 billion in drugs. Misdiagnosis rates of over 50% have been routinely reported as the cost of each false positive diagnosis has grown to an estimated \$100,000 and \$250,000 per patient. This is the basis for a worldwide market estimated at over \$2 billion, growing along with the cost of MS therapy.

Amarantus BioScience Holdings previously disclosed that it is exploring strategic options for [Amarantus Diagnostics](#), including the potential sale, co-development or spinoff opportunities, to derive the full value from its neuro-diagnostics business.

About MSPrecise®

MSPrecise® is a proprietary next-generation DNA sequencing (NGS) assay for the identification of patients with relapsing-remitting multiple sclerosis (RRMS) at first clinical presentation. MSPrecise utilizes next-generation sequencing to measure DNA mutations found in rearranged immunoglobulin genes in immune cells initially isolated from cerebrospinal fluid. MSPrecise would augment the current standard of care for the diagnosis of multiple sclerosis by providing a more accurate assessment of a patient's immune response to a challenge within the central nervous system. This novel method of measuring changes in adaptive human immunity may also be able to discern individuals whose disease is more progressive and requires more aggressive treatment.

About Amaranthus BioScience Holdings, Inc.

Amarantus BioScience Holdings (OTCQX:AMBS) is a biotechnology company developing treatments and diagnostics for diseases in the areas of neurology and orphan diseases. AMBS' Therapeutics division has development rights to eltoprazine, a small molecule currently in a Phase 2b clinical program for Parkinson's disease levodopa-induced dyskinesia and with the potential to expand into adult ADHD and Alzheimer's aggression. The Company has an exclusive worldwide license to intellectual property rights associated to Engineered Skin Substitute (ESS), an orphan drug designated autologous full thickness skin replacement product in development for the treatment of severe burns currently preparing to enter Phase 2 clinical studies. AMBS owns the intellectual property rights to a therapeutic protein known as mesencephalic-astrocyte-derived neurotrophic factor (MANF) and is developing MANF as a treatment for orphan ophthalmic disorders, initially in retinitis pigmentosa (RP). AMBS also owns the discovery of neurotrophic factors (PhenoGuard™) that led to MANF's discovery.

AMBS' Diagnostics division owns the rights to MSPrecise®, a proprietary next-generation DNA sequencing (NGS) assay for the identification of patients with relapsing-remitting multiple sclerosis (RRMS), and has an exclusive worldwide license to the Lymphocyte Proliferation test (LymPro Test®) for Alzheimer's disease, which was developed by Prof. Thomas Arendt, Ph.D., from the University of Leipzig, and owns further intellectual property for the diagnosis of Parkinson's disease (NuroPro®).

For further information please visit www.Amarantus.com, or connect with the Company on [Facebook](#), [LinkedIn](#), [Twitter](#) and [Google+](#).

Forward-Looking Statements

Certain statements, other than purely historical information, including estimates, projections, statements relating to our business plans, objectives, and expected operating results, and the assumptions upon which those statements are based, are forward-looking statements. These forward-looking statements generally are identified by the words "believes," "project," "expects," "anticipates," "estimates," "intends," "strategy," "plan," "may," "will," "would," "will be," "will continue," "will likely result," and similar expressions. Forward-looking statements are based on current expectations and assumptions that are subject to risks and uncertainties which may cause actual results to differ materially from the forward-looking statements. Our ability to predict results or the actual effect of future plans or strategies is

inherently uncertain. Factors which could have a material adverse effect on our operations and future prospects on a consolidated basis include, but are not limited to: changes in economic conditions, legislative/regulatory changes, availability of capital, interest rates, competition, and generally accepted accounting principles. These risks and uncertainties should also be considered in evaluating forward-looking statements and undue reliance should not be placed on such statements.

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