Amarantus Diagnostics Meets Primary and Secondary Endpoints in Blinded, Multi-Center LP-002 Clinical Study for LymPro® Blood Diagnostic for Alzheimer's Disease and Confirms LymPro's Fit-For-Purpose Use in Clinical Trials at the 2015 Alzheimer's Association International Conference®

- LymPro discriminates Alzheimer's disease (AD) from healthy controls with comparable accuracy to clinical diagnosis reference standard
- Data corroborate previously published findings demonstrating LymPro correctly differentiates patients with AD from healthy controls
- Fit-for-purpose validation confirms the reproducible analytical performance of LymPro for use as a diagnostic tool in clinical trials
- Amarantus to add FDA-approved (CMS reimbursed for research purposes) PET imaging agents for the evaluation of concordance with LP-002 data set

SAN FRANCISCO and GENEVA, July 22, 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), today reported positive results on the accuracy of the LymPro Test®, its blood-based diagnostic assay for Alzheimer's disease (AD), to discriminate between subjects with clinically diagnosed AD versus healthy controls at the Alzheimer's Association International Conference® (AAIC) being held July 18-23, 2015, in Washington, DC.

Amarantus Diagnostics presented data from two studies on its LymPro blood-based diagnostic assay for Alzheimer’s disease (AD) during AAIC poster sessions in abstracts entitled:
"The LymPro Test®: A Biomarker for Alzheimer's Disease Using Blood Samples from Clinically Diagnosed Alzheimer's Disease and Cognitively Intact Subjects."

"The LymPro Test®: A Fit for Purpose Validation of a Flow Cytometric Assay to Assess Lymphocyte Proliferation in Peripheral Blood Lymphocytes in Alzheimer's Disease."

The Company recently completed a multivariate analysis of predictive markers in lymphocytes and monocytes obtained from blood samples and evaluated differences in mitogen-stimulated proliferative activity between clinically diagnosed AD subjects and healthy cognitively normal (HC) controls. Results confirmed that LymPro had comparable AD diagnostic accuracy to this study's reference standard of clinical diagnosis by dementia experts, as reported by Beach et al (2102) where accuracy of clinical diagnosis of probable AD was compared to neuropathology diagnosis of AD.

"The diagnostic accuracy of LymPro, a unique peripheral biomarker, demonstrated by this study was comparable to accuracy obtained using this study's clinical reference standard for diagnosis, the National Institute on Aging/Alzheimer's Association 2011 criteria. Today's data solidifies LymPro's importance in the investigational Alzheimer's space for identification and disease screening," said Gerald E. Commissiong, President and CEO of Amarantus BioScience Holdings, Inc. "The LymPro blood-based diagnostic panel is a robust and reproducible measure of a key pathology of AD. Further, the findings corroborate previously published LymPro data."

The Company also reported confirmatory Fit-for-Purpose validation data demonstrating the excellent intra- and inter-assay precision of LymPro's most relevant and informative diagnostic biomarkers for AD. Results of this study validate LymPro's utility for use as a diagnostic assessment tool in therapeutic Alzheimer's clinical trials. Amarantus Diagnostics provides the pharmaceutical industry with LymPro biomarker services for Investigational Use Only (IUO) in clinical development programs. Fit-for-Purpose assay validation for LymPro was conducted at Icon Central Laboratories in Farmingdale, NY.

"This additional validation demonstrated for LymPro raises the importance for its potential use in biomarker-supported selection of Alzheimer's disease patients for clinical trials. It has the convenience of being a blood test while reflecting the same type of cell cycle reentry dysfunction found in the brains of these patients," said Paula T. Trzepacz, M.D., Clinical Professor of Psychiatry at Indiana University School of Medicine and member of the Amarantus Clinical Advisory Board. "LymPro has the potential to become one of the fundamental diagnostic tools in Alzheimer's drug development, and we look forward to adding FDA-approved PET imaging agents to further validate LymPro vis-a-vis diagnostic gold standards."

The LymPro Test is a flow cytometry assay that measures the response of peripheral blood lymphocytes and monocytes to mitogenic stimulation and quantifies the extent to which these cells have entered the cell division process known as cell cycle (or mitosis). Cell cycle dysregulation in neurons is a key pathology in AD that leads to neuronal death.
and associated cognitive decline, as neurons enter the mitotic process but are unable to complete cell division and undergo apoptosis (programmed cell death). With LymPro, lymphocyte and monocyte measurements are used as a peripheral surrogate for this neuronal cell dysfunction.

**STUDY SUMMARIES**

"**The LymPro Test®: A Biomarker for Alzheimer's Disease Using Blood Samples from Clinically Diagnosed Alzheimer’s Disease and Cognitively Intact Subjects.**"

**Methods:** 141 whole blood samples were drawn from enrolled study participants in vacutainer tubes designed for lymphocyte culture. Samples were shipped overnight, cultured with mitogen (PHA, 4 hrs or PWM, 4 or 20 hrs) or without in separate culture tubes, and then stained with an antibody cocktail to reveal subpopulations of lymphocytes (T, B, and monocytes) as well as expression levels of CD69 (a surface marker of cell cycle activity) cell surface expression. Lymphocyte subpopulation specific biomarkers were measured on an 8 color flow cytometer at a contract lab (Becton Dickinson). After analytical review of the flow cytometry data, N=125 of the samples passed blinded quality control (59 AD and 66 controls). Each subject's WBCs were characterized by 14 measured biomarker features in various permutations for statistical analyses, as well as two stimulation indices that were calculated to produce an additional 8 biomarker variables. Thus, results of 22 variables were analyzed statistically. These 22 were measured for each of three stimulation conditions using mitogens.

**Statistical Analysis:** Public domain feature selection algorithms or stepwise methods were used to identify optimal feature sets to maximize diagnostic prediction performance. These included logistic regression, discriminant analysis (linear and quadratic), and decision tree and random forest methods. Prediction performance was initially assessed with a 65% training set (n=81) and applied to a 35% test set (n=44), All analysis was done in JMP Pro v11.2.1 (SAS, Cary, NC).

**Results and Conclusions:** Findings from this expanded analysis of the LymPro test using multivariate analysis are consistent with the prior published reports using univariate approaches, with an overall area under the curve of 0.9229 in the training set and 0.7236 in the test set, where the test set had 87% sensitivity and 83% specificity in the training set, and 76% sensitivity and 70% specificity in the test set. This lends further support that LymPro test may have utility as a blood biomarker reflective of AD pathology. More in-depth analysis of this cohort is underway. These preliminary findings are encouraging and warrant further studies to demonstrate the utility of this blood biomarker in the differential diagnosis of patients with cognitive impairment.

**Limitations:** The study design was predicated upon cohort categorization (AD or HC) on clinical grounds only and there were no biomarkers employed in the confirmation of clinical diagnosis. Nonetheless, our test sample performed similarly to Beach et al's (2012) conclusion about clinical diagnosis that "...when optimizing for both sensitivity and specificity [against neuropathological diagnosis], the best [clinical] result was 70.9% sensitivity and 70.8% specificity."

**Conclusions and Next Steps:** Multivariate analysis using random forest found 5 candidate
variables that together generated the best performance results in ROC analysis. This preliminary algorithm holds promise as a step in the development of a bioassay algorithm that can yield both strong sensitivity and specificity. The LymPro test holds promise for use in evaluating patients though further clinical validation in diverse clinical samples, in conjunction with F18-florbetapir PET, is planned.

"The LymPro Test®: A Fit for Purpose Validation of a Flow Cytometric Assay to Assess Lymphocyte Proliferation in Peripheral Blood Lymphocytes in Alzheimer's Disease."

Methods: Whole blood samples were obtained from healthy donors, the lymphocytes were isolated and left unstimulated or subjected to mitogenic stimulation under three conditions; pokeweed mitogen (PMW) for four hours, PWM for 20 hours and phytohemagglutinin for four hours. The frequency of CD69+ and CD28+ cells as subpopulations of CD19+ B cells, CD14+ monocytes and CD3+, CD4+ and CD8+ T cells were measured by flow cytometry. Metrics included percentage, event counts and median fluorescent intensity. Experimental parameters evaluated were intra-assay and inter-assay precision and analyst-to-analyst and instrument-to-instrument performance.

Results and Conclusions: Intra-assay precision (%CV) as measured by frequency (%) of CD28+ or CD69+ cells in each cell subpopulation ranged from 0.12 to 37.3%; 32 of 36 results were ≤10%. Intra-assay precision as measured by median fluorescent intensity (MFI) ranged from 1.02 to 33.2%; 35 of 36 results were ≤30%. Inter-assay precision as measured by frequency ranged from 0.1 to 27.9%; 35 of 36 results were ≤10%. Inter-assay precision as measured by MFI ranged from 1.75 to 20.7%; 36 of 36 results were ≤30%. The analyst-to-analyst percent difference ranged from 0.07 to 39.4% when measured by frequency; 30 of 36 results were ≤20%. When measured by MFI, the analyst-to-analyst difference ranged from 2.87 to 58.4%; 33 of 36 results were ≤30%. The instrument-to-instrument percent difference ranged from 0.35 to 64.2% when measured by frequency; 30 of 36 results were ≤20%. When measured by MFI, the instrument-to-instrument difference ranged from 1.92 to 95.8%; 33 of 36 results were ≤30%. The LymPro Test was validated in a fit-for-purpose manner. The most relevant and informative markers demonstrated excellent intra- and inter-assay precision as well as good agreement between analysts and instruments. The results of this validation demonstrate the utility of the LymPro Test for use in clinical trials.

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

About Alzheimer’s Disease

According to the Alzheimer’s Association, it is estimated that over 5.4 million people in the United States suffer from Alzheimer’s disease. Over 500,000 patients are diagnosed annually, with nearly one-in-eight older Americans affected by the disease. Alzheimer’s disease is the third leading cause of death in the United States. The cost of unpaid care in the United States is estimated at over $210 billion annually. Total payments for care are estimated at over $200 billion annually, including $140 billion in cost to Medicare and
Medicaid. Alzheimer's expenditures in the United States are expected to exceed $1.2 trillion by 2050. There is no cure or effective treatment for Alzheimer's disease. Worldwide, about 35.6 million individuals have the disease and, according to the World Health Organization, the number will double every 20 years to 115.4 million people with Alzheimer's by 2050.

About LymPro Test®

The Lymphocyte Proliferation Test (LymPro Test®) is a diagnostic blood test that determines the ability of peripheral blood lymphocytes and monocytes to withstand an exogenous mitogenic stimulation that induces them to enter the cell cycle. It is believed that certain diseases, most notably Alzheimer's disease, are the result of compromised cellular machinery that leads to aberrant cell cycle re-entry by neurons which then leads to apoptosis. LymPro is unique in the use of peripheral blood lymphocytes as a surrogate for neuronal cell function, suggesting a common relationship between PBLs and neurons in the brain.

About Amarantus 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) at first clinical presentation, 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 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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