NantKwest, NantCell and NantOmics to Provide Updated Preclinical and Clinical Data in Four Abstracts at Part of the American Society of Clinical Oncology Annual Meeting

May 31, 2019

Preclinical and Clinical Data Demonstrate Advanced Deployment of Precision Medicine Tools to Analyze and Potentially More Effectively Intervene with Highly Focused Therapeutic Interventions

CULVER CITY, Calif.--(BUSINESS WIRE)--May 31, 2019-- NantKwest (Nasdaq:NK), a leading clinical-stage, natural killer cell based therapeutics company, NantCell Inc., a privately held immunotherapy company, and NantOmics, a privately held molecular diagnostic company, today announced that preclinical and clinical updates will be provided in four abstracts as part of the upcoming Annual Meeting of the American Society of Clinical Oncology (ASCO) in Chicago, IL, which runs from May 31st – June 4th, 2019.

Dr. Patrick Soon-Shiong, Chairman and CEO of NantKwest, NantCell and NantOmics, commented, “Through a unique collaboration, combining the expertise of NantOmics’ multi-omics diagnostic capabilities with NantKwest’s and NantCell’s therapeutic capabilities, we are pleased to report for the first time the ability to comprehensively analyze a patient’s circulating cell-free RNA (cfRNA) and T Cell Receptor (TCR) repertoire and therapeutically intervene across a range of tumor types. We believe this type of fully integrated diagnostic and therapeutic intervention represent the next-generation in cancer care and shows real promise in improving response rates in comparison to traditionally single agent approaches. We look forward to transitioning these advances in medicine to the clinical care setting as quickly as possible.”

Abstract Title: ***Innate and adaptive immunotherapy: An orchestration of immunogenic cell death by overcoming immune suppression and activating NK and T-cell therapy in patients with third line or greater Triple-Negative Breast Cancer (TNBC).***

Sub-category: Triple-Negative

Category: Breast Cancer—Metastatic

Meeting: 2019 ASCO Annual Meeting

Abstract Number: e12566

Citation: J Clin Oncol 37, 2019 (suppl; abstr e12566)

Author(s): Chaitali Singh Nangia, Mira Kistler, Leonard S. Sender, John H. Lee, Frank R. Jones, Omid Jafari, Patrick Soon-Shiong; Chan Soon Shiong Institute for Medicine, Laguna Hills, CA; Chan Soon Shiong Institute of Medicine, El Segundo, CA; Children's Hospital of Orange County, Laguna Hills, CA; Sanford Health, Sioux Falls, SD; Etubics Corporation, Seattle, WA; Medical Imaging Center of Southern California, Santa Monica, CA; NantKwest, Culver City, CA

Summary: Triple-negative breast cancer (TNBC) is a heterogenous subtype of breast cancer that is frequently aggressive and has limited treatment options. We hypothesize that effective and sustained response against TNBC requires a coordinated approach that: (1) reverses the immune-suppressive tumor microenvironment, (2) induces immunogenic tumor cell death and (3) Re-engages NK and T-cell tumor response against a cascade of tumor antigens. To test this hypothesis, we have developed a temporospatial approach that combines metronomic low dose chemotherapy, SBRT, off-the-shelf cryopreserved allogeneic NK cells, yeast and adenoviral tumor-associated antigen vaccines, an IL-15RαFc superagonist, and checkpoint inhibition. Methods: A phase 1b trial in patients with previously-treated metastatic TNBC was initiated. Treatment occurred in 3-week cycles of low-dose chemotherapy (aldoxorubicin, cyclophosphamide, cisplatin, nab-paclitaxel, 5-FU/L), antiangiogenic therapy (bevacizumab), SBRT, engineered allogeneic CD16 NK-92 cells (haNK), IL-15RαFc (N-803), adenoviral vector-based CEA, MUC1, brachyury, and HER2 vaccines, yeast vector-based Ras, brachyury and CEA vaccines, and an IgG1 PD-L1 inhibitor, avelumab. The primary endpoint is incidence of treatment-related adverse events (TRAEs). Secondary endpoints include ORR, DCR, PFS, and OS. Preliminary results reported on 8 subjects treated with 3rd-line or greater TNBC that have received at least 3 treatment cycles (mean = 6 cycles). All treatment was administered in an outpatient setting. All subjects had at least 1 grade ≥3 TRAE, primarily chemotherapy-related neutropenia. Grade ≥3 haNK-related AEs (fever and fatigue) were observed in 2 subjects. 2 subjects experienced SAEs. 7 subjects remain alive, with 6 subjects receiving ongoing study treatment. 1 CR (confirmed) and 2 PRs (one confirmed) have been observed to date. These preliminary data suggest that low-dose chemo-radiation combined with innate and adaptive immunotherapy can be administered safely in an outpatient setting with a manageable safety profile. Clinical trial information: NCT03387085.

Abstract Title: ***Innate and adaptive immunotherapy: An orchestration of immunogenic cell death by overcoming immune suppression and activating NK and T cell therapy in patients with third line or greater metastatic pancreatic cancer.***

Sub-category: Pancreatic Cancer

Category: Gastrointestinal (Noncolorectal) Cancer

Meeting: 2019 ASCO Annual Meeting

Abstract Number: e15787

Citation: J Clin Oncol 37, 2019 (suppl; abstr e15787)

Author(s): Tara Elisabeth Seery, Mira Kistler, Leonard S. Sender, John H. Lee, Arvind Manohar Shinde, Anand Annamalai, Patrick Soon-Shiong; Chan Soon Shiong Institute for Medicine, Laguna Hills, CA; Chan Soon Shiong Institute of Medicine, El Segundo, CA; Chan Soon Shiong Institute for Medicine, El Segundo, CA; NantKwest, Culver City, CA; St. Vincent Medical Center, Los Angeles, CA; St. Vincent's Medical Center, Los Angeles, CA

Summary:

Pancreatic cancer has multiple mechanisms to prevent immune recognition that lead to the creation of an immune suppressive tumor microenvironment. Our hypothesis is that sustained response against pancreatic cancer requires a coordinated approach that: (1) reverses the immune-suppressive tumor microenvironment, 2. induces immunogenic tumor cell death and (3) re-engages NK and T-cell tumor response against a cascade of tumor antigens. To test this hypothesis, we have developed a temporospatial approach that combines metronomic low-dose chemotherapy, SBRT, cryopreserved allogeneic NK cells, yeast and adenoviral tumor-associated antigen vaccines, an IL-15RαFc superagonist, and checkpoint inhibition. These preliminary data suggest that low-dose chemo-radiation combined with innate and adaptive immunotherapy can be administered safely in an outpatient setting.

Preliminary results of 12 subjects treated with 3rd-line or greater metastatic pancreatic cancer. All treatment was administered in an outpatient setting. AEs were primarily hematologic and managed by planned chemo dose reduction. Grade ≥3 TRAEs were observed in 9 out of 12 subjects, predominately chemotherapy-related neutropenia. 9 out of 12 subjects (75%) had a best response of stable disease (≥ 8 weeks). Median PFS is 7.1 months (4.4 – 8.8) and median OS is 8.2 months (5.7 – 9.7) with 1 subject continuing treatment

Preliminary Overall Survival of 8.2 months is encouraging for this heavily-pretreated population. Clinical trial information: NCT03586869.

Abstract Title*: Correlation between circulating cell-free RNA biomarkers and response during combination immunotherapy in previously refractory metastatic TNBC patients.*

Sub-category: Circulating Biomarkers

Category: Developmental Immunotherapy and Tumor Immunobiology

Meeting: 2019 ASCO Annual Meeting

Abstract No: e14027

Citation: J Clin Oncol 37, 2019 (suppl; abstr e14027)

Author(s): Chad Garner, Tara Elisabeth Seery, Chaitali Singh Nangia, John H. Lee, Liyang Huang, Leonard S. Sender, Shahrooz Rabizadeh, Patrick Soon-Shiong; NantHealth, Culver City, CA; Chan Soon Shiong Institute for Medicine, Laguna Hills, CA; NantKwest, Culver City, CA; Chan Soon-Shiong Institute for Medicine, El Segundo, CA; NantOmics, LLC, Culver City, CA; CSS Institute of Molecular Medicine, Culver City, CA.

Summary: A commercial liquid biopsy test was included as an exploratory component of an integrated immunotherapy clinical trial in previously refractory metastatic TNBC patients, combining innate, high-affinity natural killer cell (haNK) therapy with adenoviral and yeast-based vaccines and an IL-15 superagonist (NCT 03387085). The purpose of the study was to assess the utility of cell-free circulating RNA (cfRNA) as a predictor of treatment response. The amount and variability of cfRNA was found to be positively correlated with the tumor size. As cfRNA quantity and variability increased or decreased, a corresponding increase or decrease in tumor size was observed, respectively. Not all 18 genes showed consistent patterns of change across the six patients, however the average expression and variability of the 18 genes showed evidence of a correlation with tumor size change from baseline (p-values = 0.08 and 0.03, respectively). Only trace levels of PD-L1 expression were observed in all 6 patients at baseline, prior to the initiation of the combination immunotherapy. Among the 5 patients that showed a reduction in tumor size of at least 10%, 4 also showed an associated increase in cfRNA PD-L1 expression from nearly 0 to normalized values between 2.1 and 6.8. In an exploratory analysis in an ongoing combination immunotherapy clinical trial for TNBC showed that increasing and decreasing cfRNA levels are correlated with increasing and decreasing tumor size, respectively. Increased PD-L1 cfRNA levels are correlated with beneficial treatment response. Liquid biopsy of cfRNA could provide an effective biomarker of treatment response. Clinical trial information: NCT03387085.

Abstract Title: *TCR repertoire analysis from peripheral blood for prognostic assessment of patients during treatment*

Sub-category: Circulating Biomarkers

Category: Developmental Immunotherapy and Tumor Immunobiology

Meeting: 2019 ASCO Annual Meeting

Abstract Number: e14040

Citation:J Clin Oncol 37, 2019 (suppl; abstr e14040)

Author(s): Sadanand Vodala, Andrew Nguyen, Noe Rodriguez, Peter Sieling, Charles Joseph Vaske, Jon Van Lew, Kayvan Niazi, John H. Lee, Patrick Soon-Shiong, Shahrooz Rabizadeh; NantOmics, LLC, Culver City, CA; NantOmics, LLC, Santa Cruz, CA; NantBio, Inc, Culver City, CA; Sanford Health, Sioux Falls, SD; NantKwest, Culver City, CA

Summary:

Immune checkpoint inhibitor therapy offers substantial clinical advantage to a subset of patients but predictive/novel prognostic indicators are still scarce. T cell receptors (TCRs) play a crucial role in adaptive immunity and anti-tumor immune responses. Net diversity of TCR repertoires are altered in patients receiving immune checkpoint inhibitors. To study the prognostic significance of T cell repertoires as a biomarker of immune responses in cancer patients, TCR repertoires were characterized from peripheral blood using high throughput sequencing. Patients that show positive response had TCR clones that were stable, which may indicate an existing immune related response towards their tumor. TCR-targeted therapy potentially allows these existing T-cells to overcome blockade by tumor cells. Patients showing poor response show a TCR repertoire that is constantly changing potentially indicating that the tumor cells are not eliciting a strong T cell specific response. Further functional studies of T cell populations are planned to expand our understanding of T cell based immune therapies.

For additional information, please visit www.nantkwest, www.nantcell.com, and www.nantomics.

About NantKwest

NantKwest, a member of the NantWorks ecosystem of companies, is an innovative clinical-stage immunotherapy company focused on harnessing the power of the innate immune system by using the natural killer cell to treat cancer and virally induced infectious diseases.

NantKwest is uniquely positioned to implement precision cancer medicine, with the potential to change the current paradigm of cancer care. Natural Killer (NK) cells are a safeguard in the human body designed to recognize and detect cells under stress due to cancer or viral infection. NantKwest's "off-the-shelf" activated NK cell platform is designed to destroy cancer and virally infected cells from the body. The safety of our NK cells as well as their activity against a broad range of cancers have been tested in phase I clinical trials in Canada and Europe as well as in multiple phase I and II clinical trials in the United States. In addition to being a universal cell-based therapy that does not require individualized patient sourcing or matching, our NK cell products have been largely administered in the outpatient setting as an "off-the-shelf" living drug.

With the capacity to grow active killer cells as a living cancer therapy, our NK cells have been designed to induce cell death against cancers and virally infected cells by several mechanisms, including: (i) innate killing, whereby all of our NK platforms recognize the stress proteins typically found on cancer cells, which, upon binding, release toxic granules to immediately kill their targets; (ii) antibody-mediated killing with our haNK® platform, which are NK cells engineered to express antibody receptors that can bind to therapeutic antibody products, thereby enhancing the cancer cell killing effect of that antibody; and (iii) Chimeric Antigen Receptor directed killing using the taNK® platform, which includes NK cells engineered to incorporate chimeric antigen receptors (CARs) to target tumor-specific antigens found on the surface of cancer cells. All three modes of killing (innate, antibody-mediated, and CAR directed killing) are employed by our t-haNK™ platform, which is an innovative combination of our aNK, haNK® and taNK® platforms in a single product.

Our haNK®, and t-haNK™ platforms have been designed to address certain limitations of CAR T-cell therapy including the capability to infuse cell therapy in an outpatient setting which allows for potential reduction of risk for serious cytokine storms and protracted serious adverse events. In Phase I and II clinical trials in patients with late stage cancer, our NK cells have been administered as an investigational outpatient infusion safely with greater than 300 infusions to date at a dose of 2 *billion cells per infusion.* By leveraging an integrated and extensive genomics and transcriptomics discovery and development engine, together with a pipeline of multiple, clinical-stage, immuno-oncology programs, we believe NantKwest is uniquely positioned to be the premier immunotherapy company and transform medicine by delivering living drugs in a bag and bringing novel NK cell-based therapies to routine clinical care. NK-92, aNK, haNK, taNK, and t-haNK are trademarks of NantKwest, Inc.

For more information please visit www.nantkwest.com

Forward-Looking Statements

This press release contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. Forward-looking statements include statements concerning or implying that NantKwest will be successful in improving the treatment of cancer. Risks and uncertainties related to this endeavor include, but are not limited to, obtaining FDA approval of NantKwest's NK cells as well as other therapeutics as part of the NANT Cancer Vaccine platform as a cancer treatment.

Forward-looking statements are based on management's current expectations and are subject to various risks and uncertainties that could cause actual results to differ materially and adversely from those expressed or implied by such forward-looking statements. Accordingly, these forward-looking statements do not constitute guarantees of future performance, and you are cautioned not to place undue reliance on these forward-looking statements.

These and other risks regarding NantKwest's business are described in detail in its Securities and Exchange Commission filings, including in NantKwest's Quarterly Report on Form 10-Q for the quarter ended March 31, 2019. These forward-looking statements speak only as of the date hereof, and we disclaim any obligation to update these statements except as may be required by law.

About NantCell

NantCell is a privately held immunotherapy company with one of the broadest portfolios of biological molecules spanning albumin-linked chemotherapeutic, peptide, fusion protein, cytokine, monoclonal antibody, adenovirus and yeast vaccine therapies.

This platform of technologies has enabled NantCell to achieve one of the most comprehensive late stage clinical pipelines addressing both the innate (activated macrophage and natural killer cell) and the adaptive immune system (dendritic, CD4 and CD8 killer T cells). The pipeline constitutes over 40 immunological assets with 13 first in human immunotherapy molecules in active clinical trials. In 2019, NantCell is planning the enrollment of patients in late stage trials with 3 molecules across 17 indications in solid and liquid tumors.

In the field of oncology, NantCell's goal is to employ a broad portfolio of biological molecules that will enable it to activate endogenous NK and CD8+ T cells, and develop a T cell memory cancer vaccine to combat multiple tumor types without the use of high-dose chemotherapy.

In the field of infectious disease, NantCell's goal is to develop vaccine therapy to treat and prevent diseases stemming from HIV, Influenza, Zika, and Ebola infection.

For more information please visit www.nantcell.com

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Forward-looking statements are based on management's current expectations and are subject to various risks and uncertainties that could cause actual results to differ materially and adversely from those expressed or implied by such forward-looking statements. Accordingly, these forward-

looking statements do not constitute guarantees of future performance, and you are cautioned not to place undue reliance on these forward-looking statements.

About NantOmics

NantOmics, a member of the NantWorks ecosystem of companies, invented and developed the technologies that drive NantHealth's GPS Cancer ® platform. GPS Cancer® provides actionable intelligence and molecularly driven decision support for cancer patients and their providers at the point of care. NantOmics is the first molecular analysis company to pioneer an integrated approach to unearthing molecular variances and profiles that initiate and drive cancer, by analyzing both normal and tumor cells from the same patient and following identified variances from DNA to RNA to protein to drug. Having pioneered tumor-normal DNA sequencing and introduced whole RNA transcriptomic analysis to better inform clinical treatment decisions, NantOmics has provided molecular insights for thousands of cancer patients.

NantOmics has a highly scalable cloud-based infrastructure capable of storing and processing thousands of genomes a day, computing genomic variances in near real-time and correlating proteomic pathway analysis with quantitative gene expression and pharmacogenomic signatures, which guides the use of immunotherapies, chemotherapies and targeted therapies. Clinical studies for neoepitope vaccines using NantOmics' proprietary technologies and novel artificial intelligence platforms are currently underway. For more information please visit www.nantomics.com.

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