



**Goodwin Biotechnology Teams with Panacea Pharmaceuticals in  
Overcoming a Significant Bioconjugation Challenge for an Anti-Cancer Monoclonal Antibody**

**February 2016 -- Plantation, Florida** -- Goodwin Biotechnology, Inc., a biological Contract Development and Manufacturing Organization (CDMO) that specializes in bioprocess development and cGMP manufacturing of biopharmaceuticals utilizing Mammalian Cell Culture expression systems and Bioconjugation technologies, was selected by Panacea Pharmaceuticals, Inc. to develop a proof-of-concept conjugation of a fully-human monoclonal antibody to a radionuclide chelator to generate an antibody-chelator conjugate. The conjugate is subsequently labeled with indium-111 (<sup>111</sup>In) and other potential radioisotopes for *in vivo* diagnostic imaging and treatment of cancers.

“Panacea has developed a fully human antibody directed against the tumor-specific marker, human aspartyl (asparaginyl) β-hydroxylase (HAAH),” said Dr. Steven A. Fuller, Ph.D., Chief Operating Officer at Panacea Pharmaceuticals. “Based on the experience that Goodwin Biotechnology has in the area of Bioconjugation, they were selected to optimize, scale-up, and manufacture this antibody-chelator conjugate, of one of our lead cancer products.”

“Our initial efforts were focused on the classical random conjugation of the ‘naked’ antibody that Panacea Pharmaceuticals supplied and comparing DOTA and CHX-A’ chelators as the linkers,” noted Muctarr Sesay, PhD, Chief Scientific Officer and VP, Bioconjugation Development at Goodwin Biotechnology, Inc. “However, the results were less than desirable, based on the ability of the conjugates to bind to the antigen and incorporation of Indium<sup>111</sup>. After a thorough analysis, we recommended a new strategy using our proprietary, site-directed conjugation process that shifted the linker away from the antigen binding site (hypervariable region) on the antibody. Results from the site-directed conjugation process, when compared to the random conjugation process, it was clear that the site-directed approach was significantly superior to the random conjugation.”

“We are extremely happy that the highly skilled scientists at Goodwin Biotechnology found a way to make a viable conjugate,” said Hossein Ghanbari, PhD, Chairman & CEO/CSO of Panacea Pharmaceuticals, Inc. “When we first evaluated the random conjugation results, we were seriously considering going back to the drawing board and developing a new antibody. Finding a solution to this significant challenge saved us years of development work and a significant amount of money.”

“Now, based on promising preclinical animal study results with syngeneic mouse models, we’re working with Goodwin Biotechnology to continue development and optimization of the antibody-chelator conjugates via site-directed conjugation and will proceed to manufacture the product for additional preclinical studies and human clinical trials,” added Dr. Fuller. “It is clear that the decision to select Goodwin Biotechnology has paid off well for us.”

“We take great pride in partnering with our clients and helping them overcome significant challenges,” said SooYoung S. Lee, Ph.D., Chief Operating Officer at Goodwin Biotechnology. “Over 23 plus years, we’ve accumulated significant expertise and experience in developing robust processes for manufacturing biopharmaceuticals utilizing Cell Culture and Bioconjugation technologies. Coupled with our expertise in cGMP manufacturing of early- and late-stage clinical trial supplies, we are able to develop solutions for the challenges our clients face by working with our clients, leveraging the skill sets of our scientific staff, and listening to our clients as a team.”

**About Goodwin Biotechnology, Inc.**

[Goodwin Biotechnology](#) is a uniquely qualified CDMO that offers a Single Source Solution™ for our clients from cell line development, exploratory proof of concept projects through process development and cGMP contract manufacturing of monoclonal antibodies, recombinant proteins, vaccines, and Biologic Drug Conjugates including Antibody Drug Conjugates (ADCs) for early and late stage clinical trials. By working with Goodwin Biotechnology, clients can enhance the value of their product candidates with clear development and manufacturing strategies, as well as a road map to meet the appropriate quality requirements from the milligram and gram range to kilogram quantities as the product candidates move along the clinical development pathway in a cost-effective, timely, and cGMP compliant manner to enhance patients' lives. With over 20 years of experience as an independent integrated contract manufacturer, Goodwin Biotechnology has worked as a strategic partner with companies of all sizes from small university spin-offs to major research institutes, government agencies and large, established and multi-national biopharmaceutical companies. Based on the impressive track record, Goodwin Biotechnology has been awarded **Frost & Sullivan's Customer Value and Leadership Award for Best Practices in Mammalian Contract Manufacturing!** In addition, Goodwin Biotechnology was recently awarded 'Best in Sector: **Biopharmaceutical Contract Development & Manufacturing**' at *Acquisition International* magazine's 2015 Sector Performance Awards. [Click here](#) to view the press releases! Additional information may be found at <http://www.GoodwinBio.com>.

**About Panacea Pharmaceuticals, Inc.**

[Panacea Pharmaceuticals, Inc.](#) was founded in 1999 to discover, develop, and commercialize novel therapeutic and diagnostic products for oncology and diseases of the central nervous system. Since its inception, the Company's primary approach to cancer treatment has been immunotherapy and development of companion diagnostics for comprehensive patient management. The Company's lead drug product candidate is a nanoparticle-based therapeutic cancer vaccine that targets a novel patented tumor marker, Human Aspartyl (Asparaginy) beta-Hydroxylase (HAAH). The company relies on a close collaboration with Brown University where teams of researchers are continuing advances on the Company's core technologies. For more information, visit the company's Web site at [www.panaceapharma.com](http://www.panaceapharma.com).

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