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# **Data Presented by Independent Academic Collaborators Demonstrate Ability of Novel Manocept™ Immunotherapy to Kill Activated Macrophages from KS Patients**

DUBLIN, Ohio--(BUSINESS WIRE)-- Macrophage Therapeutics, a newly created business unit of Navidea Biopharmaceuticals, Inc. (NYSE MKT: NAVB), hosted a conference where data was presented using Manocept™ platform compound, tilmanocept, that was generated by independent academic collaborators with expertise in the HIV/**AIDS**, cancer, tuberculosis (TB), rheumatoid arthritis and cardiovascular disease therapeutic areas. The technical presentations highlighted tilmanocept's ability to target activated macrophages implicated in pathology. Specifically data were presented in:

1. Kaposi's Sarcoma cells from human tumor extracts that contain tumor associated macrophages (TAM's) and are often infected with HIV. Data demonstrated that a generic anticancer agent that has no direct activity vs. HIV, conjugated to tilmanocept killed the CD-206 positive TAM's.
2. Tilmanocept labeled with a fluorescent reporter demonstrated a high degree of co-localization with tuberculosis-associated activated macrophages, which express CD-206, from TB granulomas extracted from human and primate tissue.
3. Rheumatoid Arthritis (RA) - Data presented indicated that tilmanocept containing a florescent reporter molecule demonstrates selective localization solely into rheumatoid affected joints in a whole live animal model of RA.

Michael McGrath, M.D., Ph.D., Professor, University of California, San Francisco, School of Medicine, presented data from patient tumor extracts that demonstrated highly selective killing of only the CD206 positive cells, e.g., the tumor associated macrophages. Dr. McGrath discussed ongoing studies designed to further elucidate the tilmanocept conjugates effects on the tumor cells and its contents. "This is an approach that would be predicted to effectively target the long-lived HIV reservoirs resistant to all current anti-viral therapies," said Dr. McGrath.

Data presented by Frederick O. Cope, Ph.D., Senior Vice President and Chief Scientific Officer of Navidea, generated with colleagues Drs. Larry Schlesinger, Thomas Rosol and Wael Jarjour from The Ohio State University, demonstrated the ability of tilmanocept, conjugated to a generic active agent, to eliminate tuberculosis from TB-infected macrophages at levels significantly lower than currently clinically required. This suggests that targeting activated macrophages may improve the therapeutic index of existing narrow therapeutic index drugs. In addition, it suggests the potential utility of using tilmanocept,

linked to other active agent(s), to broadly regulate activated macrophages.

Data presented by Steven Grinspoon, M.D., Professor of Medicine at Harvard Medical School highlighted the potential for a targeted agent to activated macrophages in cardiovascular disease. "Atherogenesis is a macrophage-driven process and strategies to image and target activated macrophages in vulnerable plaque would be a significant advance in the field. Data presented by the other presenters at this meeting were encouraging, and suggests that tilmanocept is a promising compound to explore in cardiovascular disease," said Dr. Grinspoon.

Navidea director Michael M. Goldberg, M.D., who is leading Navidea's Macrophage Therapeutics efforts, commented, "the data presented today will shortly be enhanced by data from ongoing studies to further advance this novel immunotherapy approach. We are in the process of assembling a world class Scientific Advisory Board that will assist in guiding our research further. We look forward to regularly updating the market with new developments, potential partnerships and results from our ongoing studies."

### **About Macrophage Therapeutics**

Macrophage Therapeutics, a newly created business unit of Navidea Biopharmaceuticals, Inc., is developing new therapeutics based on its proprietary CD206 targeting technology platform. This will represent a new paradigm in the treatment of disease. Depending on the active agent(s) attached to the Manocept™ backbone as well as other core molecule permutations, it may be possible to approach immunotherapy in a completely novel manner. This approach has the potential to provide for management and modification of diseases that include the immediate involvement of macrophages, the biological products of macrophages, or the effective impact of macrophages or their progenitor and/or daughter elements. Thus, Macrophage Therapeutics' Manocept platform is designed to specifically address a key element, macrophage interactions, in the natural progression of clinically significant diseases that impact the lives of patients around the globe.

### **About Navidea Biopharmaceuticals Inc.**

Navidea Biopharmaceuticals, Inc. (NYSE MKT: NAVB) is a biopharmaceutical company focused on the development and commercialization of precision diagnostics and radiopharmaceutical agents. For more information, please visit [www.navidea.com](http://www.navidea.com).

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*line and distribution channels, competition, limited marketing and manufacturing experience, risks of development of new products, regulatory risks and other risks detailed in the Company's most recent Annual Report on Form 10-K and other Securities and Exchange Commission filings. The Company undertakes no obligation to publicly update or revise any forward-looking statements.*

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