santaris pharma a/s

RNA Medicines for the 21st Century

New data published in *Nature Genetics* demonstrate that tiny LNA-based compounds developed by Santaris Pharma A/S inhibit entire disease-associated microRNA families

- ***Tiny Locked Nucleic Acid (LNA) based compounds, which are 8-mer LNA oligonucleotides, successfully inhibit entire microRNA families, providing potential new approach for treating a variety of diseases, including cancer, viral infections, cardiovascular and muscle diseases***
- ***Data show high affinity and target specificity of tiny LNA-based compounds enabled functional inhibition of entire microRNA families in a range of tissues without off-target effects***
- ***Tiny LNA-based compounds are well tolerated in preclinical studies and can be delivered without the use of complex delivery vehicles***
- ***Versatility of Santaris Pharma A/S proprietary LNA Drug Platform allows LNA-based drugs to inhibit single microRNA targets or entire microRNA families, opening up development of new modalities to target a broad range of diseases***

Hoersholm, Denmark/San Diego, California, March 21, 2011 — A study published online in this week's *Nature Genetics* demonstrates that tiny Locked Nucleic Acid (LNA)-based compounds developed by Santaris Pharma A/S can inhibit entire disease-associated microRNA families. This provides a potential new approach for treating a variety of diseases including cancer, viral infections, cardiovascular and muscle diseases[1].

Santaris Pharma A/S, a clinical-stage biopharmaceutical company focused on the research and development of mRNA and microRNA targeted therapies, developed the tiny LNA-based compounds, which are 8-mer LNA oligonucleotides, using its proprietary LNA Drug Platform. The high affinity and target specificity of tiny LNA-based compounds enabled functional inhibition of both single microRNAs and entire microRNA families in a range of tissues *in vivo* without off-target effects.

MicroRNAs have emerged as an important class of small regulatory RNAs encoded in the genome. They act to control the expression of sets of genes and entire pathways and are thus thought of as master regulators of gene expression associated with many diseases. Because they dictate the expression of fundamental regulatory pathways, microRNAs represent potential drug targets in the treatment of many disease processes.

"Using tiny LNA-based compounds to successfully inhibit entire disease-associated microRNA families provides a new range of opportunities to develop novel microRNA-targeted drugs for both in-house drug discovery programs, as well as with our partners," said Henrik Ørum, Ph.D., Vice President and Chief Scientific Officer of Santaris Pharma A/S. "The versatility of our proprietary LNA Drug Platform has the potential to develop new modalities to target a broad range of diseases, including cardiometabolic disorders, infectious and inflammatory diseases, and cancer by targeting microRNAs, entire microRNA families or messengerRNAs."

The study published in *Nature Genetics* was carried out by Santaris Pharma A/S scientists and collaborators at Cold Spring Harbor Laboratory, New York. In this study, scientists demonstrated that tiny LNA-based compounds inhibited both single microRNAs and entire microRNA families in cultured cells, as well as *in vivo* in several mice tissues and in a mouse breast tumor model. The tiny LNA-based compounds were well tolerated by the mice and could be delivered without the use of complex delivery vehicles.

The Santaris Pharma A/S LNA Drug Platform is the only RNA technology with both mRNA and microRNA targeted drugs in clinical trials, demonstrating the broad utility of the proprietary platform. In September 2010, Santaris Pharma A/S successfully advanced miravirsen, a lead microRNA drug candidate targeting

(more)

miR-122, into Phase 2 studies for the treatment of patients infected with the Hepatitis C virus. In addition, Santaris Pharma A/S is advancing two mRNA-targeted drugs, SPC5001 targeting PCSK9 and SPC4955 targeting apoB, for the treatment of high cholesterol into Phase 1 in the first half of 2011.

Santaris Pharma A/S also has a robust product pipeline with its partners consisting of mRNA and microRNA drug discovery and development collaborations. These include partnerships with Pfizer, Inc. (delivery of lead candidates against up to 20 targets), miRagen Therapeutics (cardiovascular diseases), Shire plc (rare genetic disorders), GlaxoSmithKline (four viral disease drug candidates) and Enzon Pharmaceuticals (eight cancer targets successfully delivered – three are now in Phase 1 clinical studies).

About Locked Nucleic Acid (LNA) Drug Platform

The LNA Drug Platform and Drug Discovery Engine developed by Santaris Pharma A/S combines the Company's proprietary LNA chemistry with its highly specialized and targeted drug development capabilities to rapidly deliver LNA-based drug candidates against RNA targets, both mRNA and microRNA, for a range of diseases including cardiometabolic disorders, infectious and inflammatory diseases, cancer and rare genetic disorders. LNA-based drugs are a promising new class of therapeutics that are enabling scientists to develop drug candidates to work through previously inaccessible clinical pathways. The LNA Drug Platform overcomes the limitations of earlier antisense and siRNA technologies to deliver potent single-stranded LNA-based drug candidates across a multitude of disease states. The unique combination of small size and very high affinity allows this new class of drugs candidates to potently and specifically inhibit RNA targets in many different tissues without the need for complex delivery vehicles. The most important features of LNA-based drugs include excellent specificity providing optimal targeting; increased affinity to targets providing improved potency; and favorable pharmacokinetic and tissue-penetrating properties that allow systemic delivery of these drugs without complex and potentially troublesome delivery vehicles.

About Santaris Pharma A/S

Santaris Pharma A/S is a privately held clinical-stage biopharmaceutical company focused on the discovery and development of RNA-targeted therapies. The Locked Nucleic Acid (LNA) Drug Platform and Drug Discovery Engine developed by Santaris Pharma A/S combine the Company's proprietary LNA chemistry with its highly specialized and targeted drug development capabilities to rapidly deliver potent single-stranded LNA-based drug candidates across a multitude of disease states. The Company's research and development activities focus on infectious diseases and cardiometabolic disorders, while partnerships with major pharmaceutical companies include a range of therapeutic areas including cancer, cardiovascular disease, infectious and inflammatory diseases, and rare genetic disorders. The Company has strategic partnerships with miRagen Therapeutics, Shire plc, Pfizer, GlaxoSmithKline, and Enzon Pharmaceuticals. As part of its broad patent estate, the Company holds exclusive worldwide rights to all therapeutic uses of LNA. Santaris Pharma A/S, founded in 2003, is headquartered in Denmark with operations in the United States. Please visit www.santaris.com for more information.

Media Contact:

Navjot Rai
Director, Global Communications
Santaris Pharma A/S
Office: + 1 858 764 7064 ext. 206
Cell: +1 619 723 5450
e-mail: navjot.rai@santaris.com

[1] Obad, dos Santos, Petri, Heidenblad, Broom, Ruse, Fu, Lindow, Stenvang, Straarup, Hansen, Koch, Pappin, Hannon and Kauppinen. 2011. Silencing of microRNA families by seed-targeting tiny LNAs. Nature Genetics 10.1038/ng.786. http://www.nature.com/ng