

## A new approach to understanding inflammation, arthritis and diabetes

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UCSF Diabetes Center researcher Susan Carpenter was named a 2014 Sontag Foundation Fellow by the Arthritis National Research Foundation this week for her ground-breaking work in understanding inflammation. (Photo: KATHLEEN JAY/UCSF Diabetes Center)

# A new approach to understanding inflammation, arthritis and diabetes

*UCSF scientist receives award to continue research*

BY KATHLEEN JAY

UCSF Diabetes Center

This week, UCSF researcher Susan Carpenter, PhD, was selected as a 2014 Sontag Foundation [1] Fellow by the Arthritis National Research Foundation [2] for her groundbreaking research on inflammation, a condition which affects auto-immune diseases, such as diabetes and rheumatoid arthritis.

"Chronic inflammation is a major aspect of a number of conditions including rheumatoid arthritis and diabetes," Carpenter said. "While acute inflammation is mostly beneficial -- unchecked or dysregulated-inflammation can have devastating consequences leading to a wide range of diseases, such as diabetes, rheumatoid arthritis, lupus and cancer."

"Given the significance of these devastating diseases, new approaches towards understanding pathology and gene mechanism are urgently needed," she added. "My work is aimed at understanding the role long noncoding RNA plays in inflammatory signaling cascades -- the goal of which is to develop new targets for therapeutic intervention."

Carpenter's research has identified lincRNA-Cox2, a highly-inducible gene in response to inflammatory stimuli and functions to repress interferon stimulated gene (ISG) expression -- while also being required for the induction of other inflammatory genes, such as IL-6.

"It has been over a decade since the human genome was sequenced," Carpenter, a member of the McManus Lab [3] at the UCSF Diabetes Center [4], said. "Since then there has been huge improvements in our ability to carry out sequencing."

According to Carpenter, sequencing studies have shown that only a small portion -- about two percent -- of the genome results in protein, yet there are very large amounts of RNA being produced -- approximately 85 percent of the genome.

"The major class of RNA molecules produced from the genome are called long noncoding RNA (lncRNA), which are defined as transcripts greater than 200 nucleotides in length lacking protein-coding exons," Carpenter said.

Through her research, Carpenter has identified functional interactions between lincRNA-Cox2 and the heterogeneous nuclear ribonucleoprotein A2/B1 (hnRNP-A2/B1), also known as RA33 an auto-antigen in rheumatoid arthritis.

"This project aims to understand how lincRNA-Cox2 and RA33 are involved in the pathogenesis of inflammatory arthritis," Carpenter said. "Obtaining a better understanding of the role of lncRNA in inflammatory conditions could lead to the development of new

biomarkers for disease and unveil new therapeutic targets."

"Susan has a research program focused on long noncoding RNAs in inflammation, not only relevant to arthritis but highly relevant to diabetes," Michael McManus, PhD, <sup>[5]</sup> said. "Her understanding the genetics of inflammation will be highly beneficial to finding a long-term cure for a broad range of inflammatory conditions beyond rheumatoid arthritis."

For more information, visit [diabetes.ucsf.edu](http://diabetes.ucsf.edu).

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#### **Links**

[1] <http://www.sontagfoundation.com/>

[2] <http://www.curearthritis.org/the-sontag-foundation>

[3] <http://mcmanuslab.ucsf.edu/>

[4] <http://diabetes.ucsf.edu/home>

[5] <http://diabetes.ucsf.edu/michael-mcmanus>