

DARPA-SN-25-77
Future Program Announcement
Special Notice DARPA-SN-25-77
CoasterChase
Defense Advanced Research Projects Agency (DARPA)
Biological Technologies Office (BTO)

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BACKGROUND:

The purpose of this Special Notice (SN) is to provide public notification of additional research areas of interest to the Defense Advanced Research Projects Agency (DARPA) Biological Technologies Office (BTO), specifically for the forthcoming CoasterChase program.

When released, the solicitation will be made available at <https://sam.gov/>.

PROGRAM GOALS:

Expanding on lessons learned from prior DARPA Biological Technology Office (BTO) programs ([N3](#), [HAPTIX](#), and [ElectRx](#)), CoasterChase seeks to understand whether modulating neurons in the enteric nervous system (specifically the small intestine) could modulate the warfighter stress response under extreme conditions, improving training recall and decision-making in the moment and mitigating post-traumatic stress disorder (PTSD) in the long term.

CoasterChase aims to achieve these goals by exploring the effects of multiple stimulus modalities on the neurons of the small intestine as well as developing a sensing and stimulation platform in an ingestible form factor. Through exploring the response properties of neuropeptide Y (NPY)-producing enteric neurons as well as understanding requirements necessary to cause a stimulus-evoked change in the concentrations of cortisol and NPY, CoasterChase will deliver a new understanding of enteric neuromodulation.

Concurrently, through sensing biomarkers that arise as a function of different stimulation paradigms, CoasterChase will explore the dynamics of stress response activation. Finally, through the development of the ingestible sensing/stimulating platform, CoasterChase will enable active neuromodulation of the hypothalamic-pituitary-adrenal (HPA) axis through selective stimulation of a subset of enteric neurons. This technology will then be used to explore task-related performance as a function of cortisol (and NPY) concentrations in both acute and chronic *in vivo* preparations.

CoasterChase is a 24-month fundamental research program with two 12-month phases (base and option) that addresses two parallel functional areas (FAs). The first functional area (FA1) is focused on exploring enteric targets and stimulation parameters to modulate biomarkers of acute stress in empirical models, and the second functional area (FA2) encompasses the development of hardware capable of enteric sensing and stimulation in an ingestible form factor.

Performer teams are expected to have a range of expertise including: conducting studies of empirical models of acute and chronic stress; the HPA axis; neuromodulation; biomolecular

sensor design; cellular response to electrical, thermal, and/or mechanical stimulation; stimulation parameterization; development of closed-loop systems; and development of ingestible devices.

DARPACONNECT:

For those new to DARPA or national security, DARPA makes available a free, comprehensive resource via DARPAConnect on how to do business with the agency. In addition to DARPA 101 materials, relevant preparatory modules include “Making the Most of a Proposers Day” and “Understanding DARPA Broad Agency Announcements.” Registration and access are free at <http://www.darpaconnect.us/>.

ADMINISTRATIVE:

This Special Notice is issued solely for information and program planning purposes and does not constitute a formal solicitation for proposals or white papers.