Good Health is a science and technology development campaign conceived by CASIS in collaboration with the NASA Human Research Program (HRP), the NASA Space Biomedical Research Institute, and the NASA Space Life and Physical Sciences Research and Applications (SLPSRA) division in the Human Exploration and Operations Mission Directorate (HEOMD) to enable open source science on the ISS National Lab to improve human wellness on Earth. The objective is to leverage advances in personalized medicine using an integrated multi-omics approach to generate genomic, transcriptomic, proteomic, metabolomics, and systems biology data for astronaut crews, for model organisms, and for cell lines exposed to microgravity.

Ultimately, the Good Health Campaign will generate richly phenotyped longitudinal data from humans, model organisms, and cell lines for entry into the NASA GeneLab platform (and possibly the appropriate NIH Personalized Medicine Initiative database) to enable community-driven reference experiments to generate standard, common, and open reference datasets to act as a powerful, transformational resource for scientific throughput and medical innovation to enhance human wellness. These data platforms will act as an open, freely accessible repository to promote the development of new scientific hypotheses not previously conceived and novel experiments not previously envisioned for improvement of human health and well-being.

Based on the philosophy of open science and a systems biology infrastructure developed by NASA for GeneLab, the Good Health Campaign will maximize the scientific return on investment and maximize the use of the ISS given the limited number of biological and translational medicine research opportunities in space. CASIS will foster institutional partnerships with industry, public-private consortia, other government agencies and academic institutions to leverage sustaining investment to generate data that will contribute to the open source science databases for humans and model organisms.

In summary, Good Health is an over-arching CASIS initiative to translate observations in microgravity to health benefits on Earth. Specifically, we seek to understand the mechanisms that underpin the transition from wellness to disease—a process in many cases accelerated by microgravity—so that interventions (e.g., lifestyle changes, drug or cell based therapy, surgery) can be designed to preserve health on Earth. In parallel,
projects that benefit from the space environment in efforts to improve drug discovery, development, and delivery systems, as well as healthcare diagnostic tools, also fall within the goals of Good Health.

We believe that space-based projects studying the mechanisms of wellness-to-disease transitions hold enormous potential for optimizing human wellness on Earth as well as preserving astronaut health and improving their recovery following the insults of microgravity. Such studies of both humans and animal/cell-based models will open up our understanding of the many changes that organisms undergo physiologically and will deepen our understanding of the human body’s response to and recovery from extreme perturbations to the system. We believe we may obtain crucial insights for discovery of new biomarkers that enable early diagnoses and effective and precise therapeutic responses to disease transitions experienced by millions of individuals on Earth.