NIH Common Fund Extracellular RNA Communication Program
NIH Council of Councils - September 2025

Once thought to exist only within cells, the discovery that RNA can also be released from cells as “extracellular RNA” (exRNA) has led to a paradigm shift in the understanding of intercellular communication. Discoveries about how exRNA and its carrier vehicles are involved in cell-to-cell communication brought new, perplexing questions about how exRNAs affect human health and disease. The NIH Common Fund's Extracellular RNA Communication program launched in 2013 to unlock the mysteries of these molecules.

Stage 1 of the program aimed to establish fundamental biological principles of extracellular RNA secretion, delivery, and impact on recipient cells. The program also aimed to catalogue exRNAs in human biofluids, understand the clinical utility of exRNAs to diagnose, monitor, and treat disease, and establish a data and resource repository for the research community. Stage 2 of the program was launched in 2019 to improve exRNA carrier separation technologies and single extracellular vesicle analysis, a critical need identified during Stage 1.

Over its 10-year lifespan, the program brought together researchers across different disciplines to form the Extracellular RNA Communication Consortium (ERCC), resulting in more than 960 publications (including a 2019 Cell publication package) that have been cited over 100,000 times. The exRNA Portal contains exRNA datasets (exRNA Atlas), novel tools (EV Antibody Database), and resources for the field. Since the exRNA Atlas launch, there have been over 550,000 data downloads by more than 40,000 users from 55 countries.

ERCC provided evidence that there are many carriers of exRNA and that each holds distinct cargo. Extracellular vesicles and other exRNA carriers are now known to be much more heterogeneous than originally believed. ERCC also contributed to the clinical use of exRNA and associated carriers as biomarkers, diagnostics, and therapeutics. Recent translational applications include exRNA-related technologies repurposed as novel diagnostics in response to the COVID-19 pandemic, the clinical use of extracellular vesicle-based biomarker assays, and exRNA carriers as drug delivery platforms. ERCC investigators also produced 25 unique inventions and submitted more 50 patent applications.

NIH funding in this space has increased rapidly in the years since the program’s launch, underscoring the innovative, catalytic nature of the NIH Common Fund program. As the program sunsets, we are confident that it has contributed fundamental knowledge and resources to the field of exRNA biology, and accelerated progress towards the use of exRNA for clinical applications.