

The National Research Data Infrastructure for Immunology (NFDI4Immuno): Building a framework for comprehensive immunological data integration and analysis, collaboration and Open Science.

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In the era of advanced single-cell technologies, particularly mass cytometry, capable of generating very information-rich datasets, the necessity for data sharing and reuse has grown significantly in immunological research. To address this need, the National Research Data Infrastructure for Immunology (NFDI4Immuno) initiative has been founded.

Here, we present how the NFDI4Immuno initiative aims to integrate immunological data and metadata from various experimental technologies, including cytometry, sequencing, immunoassays, and imaging, to provide a holistic view of immunological processes. The initiative strives to enhance scientific collaboration by harmonizing data representations, metadata standards, ontologies, and programmatic interfaces with other NFDI consortia, promoting seamless queries and cross-referencing. The project is committed to support users in effectively utilizing its resources and to foster the adoption of FAIR principles (findability, accessibility, interoperability and reusability) within the immunological community to contribute to the broader cultural shift towards Open Science. Finally, NFDI4Immuno plans to establish and manage a network of federated repositories for immunological data and to develop tools and services that facilitate standardized and reproducible data analyses, reinforcing scientific rigor and transparency.