



Database Strategy

Periodic Table of Food Initiative Request for Proposals

The Periodic Table of Food Initiative (PTFI), a global effort to create a public database of the biochemical composition and function of the food we eat using the latest mass spectrometry technologies and bioinformatics, is seeking proposals for a Database Strategy (the Strategy). The Strategy is meant to scope out the feasibility, user needs, analytical tools and costs of two interrelated databases: a mass spectra database and the Periodic Table of Food (PTF). This Strategy will be shared with the PTFI community for feedback and edited accordingly. PTFI will name an institutional home in early 2021 who will adopt this Strategy. Above all else, this Strategy is meant to be a collaborative input to a multi-party initiative.

We recognize that one lab or institution may not be able to execute all aspects of this plan and encourage thoughtful collaboration between labs or institutions.

Please see our website www.foodperiodictable.org for more information on the PTFI.

OVERVIEW: PERIODIC TABLE OF FOOD INITIATIVE

Food is at the center of the world's most urgent challenges and largest opportunities. Yet our scientific understanding of the foods that nourish us is still rudimentary. At most, 150 of food's biochemical components are measured and tracked in conventional databases, which only represents a tiny fraction of the tens of thousands of biochemicals in food. A food system that supports human and planetary health requires a rigorously collated public database of the full range of nutritionally relevant molecules in food to catalyze research and innovation that will enable us to understand the relationships between food, diet, health, nutrition, and environment.

The Periodic Table of Food Initiative (PTFI) is a global effort, currently funded by the Rockefeller foundation. The PTFI will strengthen and support ongoing work by institutions around the world by developing low-cost mass spectrometry kits, standards, methods, cloud-based analytical tools, and a public database – the Periodic Table of Food (PTF) – that will include a quantitative and qualitative analysis of thousands of foods.

The PTFI will begin by analyzing 1,000 foods that are representative of the geographic and cultural diversity across the world. Once the database is in place, the scientific community and private sector can build on this public resource by adding analysis of additional foods, varieties, and preparation methods. The PTFI technical platform will enable conditions for a rapid acceleration in research and innovation in both the public and private sectors.

DATABASE STRATEGY COMPONENTS

The Periodic Table of Food is meant to be very broadly accessible. It must be easy to use and the data must be widely shareable. One key input to the PTF is mass spectra data, which is to be addressed in this proposal. Another set of inputs will be the metadata associated with samples and aliquots. However,

metadata is not in the scope of this proposal. Instead it is addressed directly in the Sample Management Strategy. The PTFI Database Strategy should consist of the following elements:

- **Mass Spectrometry Data Storage:** The PTFI should have a database that can store full spectra from the untargeted and targeted mass spectrometry analyses. The data should be formatted in such a way that they are useful for comparison with each other. This section of the strategy should include (but not be limited to):
 - **Users:** Who will use this database and how does the database need to be built to be accessible to these users?
 - **Analytical and Bioinformatics Tools:** What analytical and bioinformatics tools does this database need to include for data to be standard, comparable, and useable by outside users?
 - **Compatibility with PTF:** How will this data feed into the broader PTF?
 - **Cost Scope:** What is the cost to get this database off the ground and running?

- **Periodic Table of Food:** The crux of the PTFI is the Periodic Table of Food itself, a broadly accessible outward-facing database that should take all the standard inputs from food analyses and present them in a compelling, comparable, and standardized way for a variety of end users. This section of the strategy should include (but not be limited to):
 - **Users:** Who will use this database and how does the database need to be built to be accessible to these users?
 - **Analytical and Bioinformatics Tools:** What analytical and bioinformatics tools does this database need to include for data to be standard, comparable, and useable by outside users?
 - **Cost Scope:** What is the cost to get this database off the ground and running?
 - **Scoping the ability to federate data:** How can the database be designed to allow external users to bring in their own data for comparison and analysis? What are the legal/policy requirements to allow selective data-sharing?
 - **Incorporation of outside databases:** How will the PTF incorporate data from the spectra database and the biobanking database? What APIs will be needed?
 - **UX Design:** How can the database maximize ease-of-use and adoption by the widest number of users?

SUBMISSION GUIDELINES

Expressions of Interest should be 2-3 pages and outline 1) your (organization's) qualifications to write the plan; 2) examples of similar work you have completed; 3) your expected costs for writing the plan; and 4) your expected timeline for completing the plan. Proposals are due to ptfi@merid.org on October 22nd.

The plan authors will have two months to complete the Database Strategy and are expected to interact with members of the PTFI community with interest/expertise in database creation and management. In addition, they are expected to meet regularly with the PTFI Lead Strategist and Technical Advisor.