

H Foundation
Pilot Project Awards
Quantitative Bioelemental Imaging Center (QBIC)



Release Date: June 5, 2013

Application Due Date: July 7, 2013

Funding: \$5,000 per project; potential for additional \$5,000 for joint project with 2nd CLP Core (ChemCore, HTA, PCE, rPPC, CAMI or DTC)

Through the generous support of the *H Foundation*, members of the **Basic Sciences Research Division** of the *Robert H. Lurie Comprehensive Cancer Center of Northwestern University* can apply for a pilot project award to **advance basic and translational research projects relevant to cancer**. The pilot project awards will provide up to \$5,000 directly to the **Quantitative Bioelemental Imaging Center (QBIC)**. It is expected that these awards will enable investigators to obtain preliminary results that can be used to support research grant applications to external funding agencies for more extensive projects.

Award Objectives and Scope

The overall purpose of this award is to fund the use of the QBIC facility to carry out pilot projects that require elemental analysis and/or imaging with basic or translational research objective relevant to cancer. The proposals **must represent new and innovative research, not extensions of currently funded projects**, for which pilot funding is needed to generate preliminary data for longer-term programs. It is envisioned that promising pilot projects will be developed into R01, R03, or R21 grants.

QBIC Services

QBIC has developed a suite of high-resolution instruments capable of quantitatively imaging elements in individual cells, tissues, and materials. QBIC is a shared resource facility which provides researchers with access to state-of-the-art imaging and quantification instrumentation. Services provided by the technical staff include: instrument training, sample preparation and analysis, experiment design, and grant proposal assistance. Instrumentation includes an automated ICP-MS for metal quantification (coupled to either HPLC for speciation and metalloenzyme analysis or laser ablation for elemental mapping), flame and graphite furnace AA for complex sample matrices and low volume elemental analysis, microwave digestion for sample preparation, and a microscopy suite that includes an inverted laser scanning confocal microscope and an upright laser scanning confocal microscope both coupled to a solid state 2-photon laser with permissible excitation wavelengths of 350-500 nm, 488 nm, 543 nm, and 633 nm. The combination of both extremely high sensitivity elemental analysis and high resolution imaging enables QBIC customers to perform cutting edge experiments. More information can be found at <http://qbic.facilities.northwestern.edu/>.

Examples of analyses that can be done in QBIC for potential pilot projects include, but are not limited to, the following:

Elemental Analysis

- Method Development and optimization for microwave digestion of materials, tissues, cells, and environmental samples
- Metal concentration determination down to pg L⁻¹ using ICP-MS (fully automated via CETAC 260 autosampler, 2-4 minutes per sample)
 - Determining endogenous metal content in cells and tissues such as Mg, Mn, Zn, Fe, Ca, S, P, Na, K, Co, Ni, Cu
 - Determining metal content in solutions, materials, cells, and tissues (e.g. Gd, Au, Fe, Ag etc. to determine cell uptake, retention, and biodistribution of imaging/nanoparticle probes)
- Method development and optimization for speciation analysis using HPLC-ICP-MS
 - Metalloproteins and enzymes using cation. anion. or size exclusion columns

- Arsenic, Chromium, Platinum speciation analysis
- Method development and optimization for elemental mapping using laser ablation (LA)-ICP-MS
 - Elemental mapping of endogenous metals in tissues
 - Elemental mapping of exogenous metals such as Au, Fe, Gd, Pt etc. to determine the distribution and location of chemotherapeutics, delivery vehicles, and imaging agents
 - Metal analysis of polyacrylamide or agarose gels and identification of metalloenzymes and proteins
- Method development and optimization for small volume (10 μ L) elemental analysis using flame or graphite furnace atomic adsorption (AA) spectroscopy

Microscopy

- Method development and optimization for confocal laser scanning microscopy (CLSM)
 - Fluorescent probe design and testing using a software tunable 2-photon solid state laser (690 nm – 1000 nm excitation)
 - Limitless excitation
 - Inverted or Upright CLSM
 - Meta detector for spectral scanning, fluorescent fingerprinting, and ratiometric probe analysis
 - Fully equipped injection apparatus including motorized calipers and picoinjector for hard to deliver probes such as, DNA, siRNA, shRNA, etc.

Application Process

Applications Due July 7, 2013

- To discuss projects and feasibility with QBIC, contact Keith MacRenaris at keithmacrenaris2009@u.northwestern.edu
- Up to 2-page application (including figures and references) with the following sections: Specific Aims, Research Plan, Expected Outcomes, and Potential Pitfalls
- The application should **clearly state the cancer relevance** of the project
- Describe the innovative aspects of the application in the context of existing data and publications
- Give a brief description of how the pilot project data will be used to achieve longer-term research funding or continuation of the project
- Include any preliminary data on probe, nanoparticle, or material design and any results about cell uptake, toxicity or distribution
- Include a current NIH-style biosketch (limit 4 pages total) for the PI and any key personnel
- Applicants should not submit a budget. Applicants whose projects are reviewed will be provided a suggested research plan and associated budget prior to final award notification.

Evaluation Process

Applications will be evaluated based on:

- Cancer relevance
- Overall scientific merit, with particular attention given to the innovative characteristics of the proposal and the unique outcomes that are expected
- Likelihood of successfully achieving the application's aims within the scope of the award
- Prospects for obtaining continued funding of the project

Responsibilities of the Awardees

As a condition of funding, awardees will be expected to submit a one-page progress report two months prior to the end of the project year. Award funding will be expended within one year. Unspent funds will be withdrawn and reallocated to other projects.

Applications should be submitted via NUCATS ASSIST at: <https://grants.nubic.northwestern.edu/welcome>

Application deadline: July 7, 2013. Funding decisions will be announced in July.

For questions regarding any of the H Foundation Pilot Awards, contact Jenna TerMolen at (847) 467-0965 or email jter@northwestern.edu