

## Research

Seeking to identify biomarkers for diseases and conditions that presently do not have effective diagnostic indicators, particularly for rare diseases, the Center strives to fill the gap between basic scientific research and commercial development of effective clinical diagnostics.

## Education

The Center educates graduate students at KGI and undergraduate engineering students at Harvey Mudd College in the development of diagnostic tools for biomarker discovery. Students learn to operate in a Good Laboratory Practice facility that handles human samples, and they gain valuable hands-on experience in quality assurance, assay validation and regulatory compliance, areas that are not commonly addressed in an academic setting.

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## Laboratory

The Center for Biomarker Research's laboratory contains an array of equipment to support its research efforts:

BCI FC500 MPL Cytometer  
BCI CEQ 8800 DNA Sequencer  
BCI CEQ 8000 DNA Sequencer  
BCI ProteomeLab PF2D HPLC  
BCI L8-80M Ultracentrifuge  
Biomek FX Dual Arm  
BCI P/ACE MDQ CE System  
BCI DU 640i Spectrometer  
Sorvall RT 6000D Centrifuge  
BCI Microfuge 22R Centrifuge  
ThermoFinnigan ESI MS/MS  
Typhoon Scanner  
BCI J2-21 Centrifuge  
BSL2 facilities for Cell Culture



## Current Research

We have initiated a translational and collaborative National Science Foundation PFI project involving industry (Beckman Coulter, Inc.), a non-profit organization (National Organization of Rare Disorders), and academia (Harvey Mudd College and KGI) to educate translational scientists and to discover and commercialize new disease-specific biomarkers.

Our initial effort is focused on Inclusion Body Myopathies (IBM). These rare diseases are a diverse group of muscle-wasting disorders that share similar histopathology with sporadic Inclusion Body Myositis and senile plaques found in Alzheimer's brain disease. The autosomal recessive form, IBM2, is the most common and is due to a mutation in the rate limiting enzyme for sialic acid synthesis. It usually affects young adults, between the age of 20-35 years, and often leads to severe disability and confinement to a wheelchair within 10-15 years. IBM2 is a recessive genetic disorder, which means it can happen to anyone, even without

family history of the disease. Most of the patients have healthy parents who were carriers of the disease without knowing – the patients and their families had never heard of IBM2 prior to their devastating diagnosis.

The Center works with the HIBM Research Group (HRG), a California non-profit public benefit corporation founded by Dr. Daniel Darvish engaging in medical research on HIBM. Over the past few years, HRG has established a depository center for maintaining and distributing reagents and resources necessary for research on IBM2. As with many rare disorders, there is a significant need to develop biomarkers for IBM2 that can be useful in clinical and molecular evaluation of the disease. Such biomarkers will allow us to monitor progression of the disease and determine the effectiveness of therapy early in clinical trials, which may translate to significant cost and time savings. KGI and HRG have begun a team-oriented effort to develop and validate IBM2 specific biomarkers.

"I believe that we may all look back years from now with pride that we have done something great."

Daniel Darvish, MD



## Center Goals

- To provide world-class education to KGI students and the community at large on biomarkers and personalized medicine
- To successfully research and commercialize the use of biomarkers as diagnostic markers of disease

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## Center Leadership

The Center is led by Director **Jim Osborne, PhD**, KGI's Robert E. Finnigan Professor of Applied Life



Sciences, who joined the faculty after a 25-year career at Beckman Coulter, Inc., most recently as the company's Corporate Vice President of Advanced Technology. Osborne earned his Bachelor of Arts and Master of Science degrees in chemistry from the University of Maryland in Baltimore County and his

doctorate in biochemistry from the University of Maryland Medical School in Baltimore. His areas of expertise are protein biochemistry, protein structure, diagnostic applications and laboratory automation.



**Craig W. Adams, PhD**, Assistant Director, is also a recent arrival from Beckman Coulter, with 26 years of experience in the pharmaceutical and diagnostic industry. Adams received his PhD from the Department of Microbiology and Molecular Genetics at UC Irvine's College of Medicine. While at Beckman

Coulter, he directed efforts to produce new diagnostic assays for rheumatic heart disease, prion disease, and improved multiplex heterogeneous and homogeneous immunoassay methodology. Adams also serves as a research associate professor and Director of the Team Masters Project program at KGI.

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Center for Biomarker Research

KECK GRADUATE INSTITUTE

of Applied Life Sciences

# Center for Biomarker Research

*Dedicated to education and applied research activities that expand knowledge and development of biomarkers as a tool for diagnostics, drug development and the practice of medicine in the 21st century.*

