

WINDOW

2006 No. 4

THE MAGAZINE FOR GE HEALTHCARE CUSTOMERS AND BUSINESS FRIENDS

NORTH AMERICAN / INTERNATIONAL EDITION

Molecular Imaging Re-imagined.

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PREDICT • DIAGNOSE • TREAT • MONITOR • INFORM

About GE Healthcare

GE Healthcare provides transformational medical technologies and services that are shaping a new age of patient care. Our expertise in medical imaging and information technologies, medical diagnostics, patient monitoring systems, performance improvement, drug discovery, and biopharmaceutical manufacturing technologies is helping clinicians around the world re-imagine new ways to predict, diagnose, inform and treat disease, so their patients can live their lives to the fullest. GE Healthcare's broad range of products and services enable healthcare providers to better diagnose and treat cancer, heart disease, neurological diseases, and other conditions earlier. Our vision for the future is to enable a new 'early health' model of care focused on earlier diagnosis, pre-symptomatic disease detection and disease prevention. Headquartered in the United Kingdom, GE Healthcare is a US\$15 billion unit of General Electric Company (NYSE: GE). Worldwide, GE Healthcare employs more than 45,000 people committed to serving healthcare professionals and their patients in more than 100 countries. For more information about GE Healthcare, visit our website at www.gehealthcare.com.

The acquisition of Biacore breathes even more life into Life Sciences

GE Healthcare recently completed the acquisition of Biacore International AB, a global supplier of systems for protein interaction analysis. The integration of Biacore's world-leading protein interaction analysis systems into the product portfolio of GE Healthcare Life Sciences creates a center of excellence that offers a wide-range of solutions to the life science community. Products from both companies are today used from early research in academia through to manufacturing and quality control in the pharmaceutical and biotechnology industries.

Unmatched protein interaction analysis

GE Healthcare's Life Sciences business is a global supplier of protein and proteomics analysis instruments and laboratory consumables, meeting the needs of scientists in academia and industry for protein and proteomics analysis in research, development, and manufacture.

Biacore brings to GE Healthcare a suite of advanced instruments and products dedicated to protein interaction analysis, one of the hottest areas of basic and therapeutics-oriented protein research. More than 4,000 peer-reviewed scientific publications have used Biacore systems to study protein interactions. In drug discovery and development, Biacore systems are used in primary screening, lead characterization and optimization, pre-clinical and clinical development, and manufacturing and quality control.

Uniquely, Biacore's protein interaction analysis systems utilize the natural phenomenon of surface plasmon resonance (SPR) to deliver high-quality data in real time. No other technology provides such comprehensive real-time protein interaction information, without the use of

labels and in one system. Adding Biacore systems and products to GE Healthcare's portfolio creates a breadth of protein and proteomics analysis solutions that are second to none.

Biacore systems generate unique data on the specificity, kinetics, affinity, and thermodynamics of interactions between proteins and other molecules, including low-molecular-weight drug candidates. These data give insights into protein functionality, help elucidate disease mechanisms, and play a key role in decisions of therapeutics development. Biacore systems are also noted for speed. In particular, Biacore systems enable protein interactions involving monoclonal antibodies and other therapeutic proteins to be fully characterized within days instead of months.

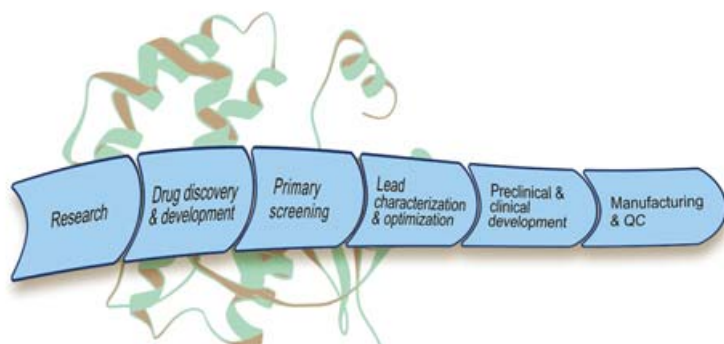
Biacore systems are used for applications such as biomarker discovery, lead characterization, monoclonal antibody characterization, proteomics, immunogenicity assays, and therapeutics development and manufacturing. Biacore customers include life science research centers worldwide, every leading global pharmaceutical company, and a broad array of biotechnology companies.

In an adjacent market, Biacore also offers food analysis solutions, providing key manufacturers with a system and ready-to-use kits for determining food quality and safety.

Protein analysis solutions more comprehensive than ever

"Biacore is a global leader in the field of protein interaction analysis, which gives scientists critical insights into the role of proteins in disease as well as their influence on the suitability of potential drug candidates," says *Peter Ehrenheim*, president and CEO of GE Healthcare Life Sciences. "By combining Biacore's technology, products and brand with GE Healthcare's broad product offering, we will be able to bring significantly enhanced solutions to the life science community."

Biacore and GE Healthcare Life Sciences are both based in Uppsala, Sweden. GE Healthcare will combine their expertise to create in Uppsala a world-leading center of excellence in protein science.

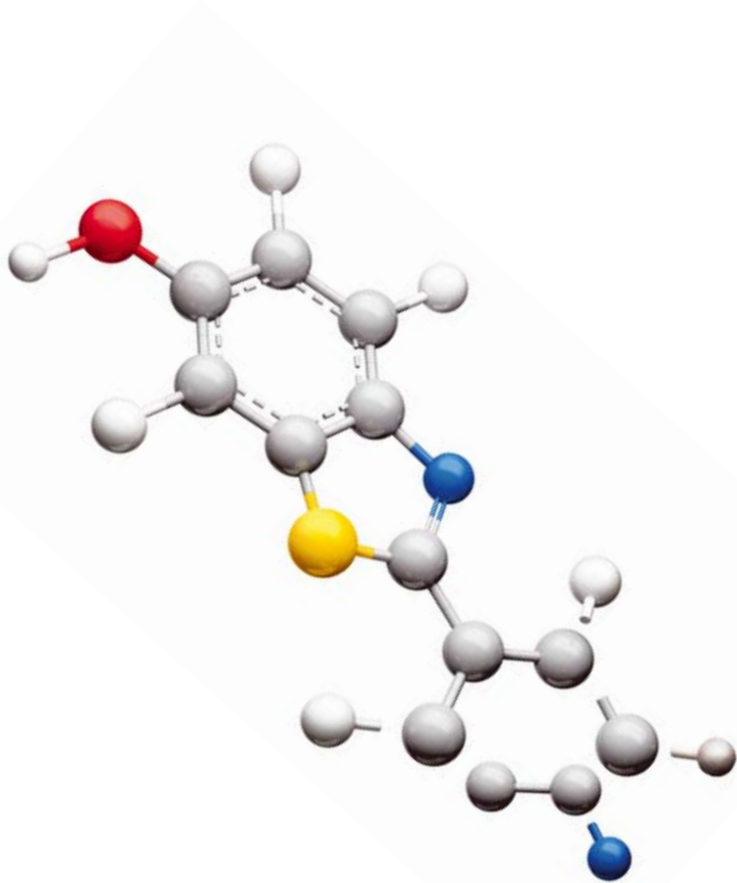


Biacore and GE Healthcare's protein analysis products run the gamut of applications in drug discovery, development, and production.

Imanet:

expediting
the journey
to early health

Positron emission
tomography (PET)
scanning at
GE Healthcare's
Imanet™ drives the
future of predictive
diagnostics forward.



Molecular structure of Pittsburgh compound B (PIB) molecule.

Where does a drug candidate go in the body? How can the correct dose be determined? For pharmaceutical scientists facing such fundamental problems of drug development, the PET scanning capabilities of GE Healthcare's Imanet are a unique resource. Imanet (a contraction of 'imaging' and 'network') combines GE's advanced radiotracer research and development centers in Hammersmith, England; Uppsala, Sweden; and Turku, Finland. Together and separately, the three R&D centers run PET clinical studies for clients in the pharmaceutical and biotechnology industries. For convenient access to patients, each center resides on the campus of a university hospital.

Imanet's staff includes more than a hundred of the best minds in molecular imaging, with specialties ranging across neurology, oncology, mathematics, radiochemistry and physics. About 35 percent are doctoral scientists. And the two chief officers, *Bengt Långström*, PhD, chief scientific officer of Imanet and *David Brooks*, MD, chief medical officer of Imanet, have been honored for major contributions to their fields. Since Imanet's inception in 2001, the center's researchers have validated more than 40 different radiotracers in human clinical studies and filed more than 70 patents.

Mission possible

"Imanet has had two primary missions," says *Bich Le*, general manager of Imanet. "First, to discover and develop new PET radiodiagnostics for GE Healthcare. Second, to help pharmaceutical companies prepare for clinical trials by using radiotracers made from their new compounds for dose-occupancy and dose-selection studies." This second mission helps the first, as clients with compounds that failed therapeutically but still have diagnostic potential, are collaborating with Imanet to develop new radiotracers.

*Some of the brains
behind Imanet
in Turku*



"Now, GE Healthcare has added a third mission to the mix," explains Dr Brooks, "to aid in the imminent pursuit of early health. Each of us has a genetic makeup that helps predict the diseases we are most likely to succumb. If, by using PET scanning along with genomics and proteomics, we are able to read an individual's risk of disease, we will be closer to stopping that disease before it happens and better able to rationalize the choice of therapeutics." It's an aggressive mission, but one that spurs on the imagination of Imanet and its clients.

So, exactly what is Imanet currently working on? Let's sneak a peek into the future.

Brain disorders

One exciting project involves Alzheimer's disease (AD) and Pittsburgh compound B (PIB), a GE radiotracer now in clinical trials. Preliminary results suggest that PIB PET scans may be useful in the diagnosis of AD in cases where neurologists are uncertain or rule out AD for other patients. (See article on PIB research on page 22.)

Beyond neurology

PET scans of the brain were some of the earliest applications of PET and may still be the best known. Much Imanet research and work for clients is in the field of neurology. But other Imanet projects reflect the wider breadth of PET applications for drug development. In cardiology, for example, Imanet is developing radiotracers for determining if a heart attack victim is susceptible to arrhythmias and in need of a pacemaker. Another example in development at Imanet are new ways to image inflammation that not only reveal if an organ is inflamed but which cells are involved.

In oncology, Imanet is developing radiotracers that may predict which tumors will respond to different types of cancer drugs. Notably, Imanet has begun a first-in-man clinical study of information provided by a PET radiotracer designed to bind to new blood vessels in growing tumors. Beyond a certain size, cancerous tumors must recruit new blood vessels in order to sustain accelerated growth. Imaging this vascular process, known as tumor angiogenesis, may enable researchers and clinicians to monitor the effectiveness of anti-angiogenic cancer drugs.

Simplifying PET infrastructure

Carbon-11 and fluorine-18, the main isotopes used in radiotracers, are radioactive for only a few minutes. For this reason, PET facilities in hospitals use instruments called cyclotrons to generate the isotopes on demand. Recognizing that producing radiotracers is expensive, Imanet is developing ways to reduce costs by streamlining PET infrastructures. Imanet research in radiotracer microfluidics chips is a step in this direction. "One of these chips could miniaturize a multi-stage radiotracer synthesis," says Dr Brooks. "It avoids all sorts of complicated glassware and multiple stages of chemical reactions that we use currently."

Clients encouraged to use radiotracers early

Imanet clients range from large pharmaceutical companies to small biotech firms. Larger clients often employ their own PET specialists, who understand that PET studies of drug uptake, binding, and dosage can provide powerful information that helps make decisions to run Phase II and Phase III clinical trials much easier.

While not all drugs can be modified into radiotracers, many can. With a radiotracer, PET studies provide dose guidance beginning with Phase I trials and proof-of-concept data for submission to regulatory agencies. "So it is always worth considering using PET imaging for any new agent," says Dr Brooks. "The earlier companies call Imanet, the more useful we can be, often saving time and money and bringing a depth of expertise to move you by the speed bumps that can often stall or delay critical programs."

Realizing the vision of early health

With a steady flow of imaging and drug development programs, combined with determination in bringing breakthroughs to molecular medicine, Imanet is a force to expedite the journey from bench to bedside and enable the healthcare industry to realize the vision of early health.

Sharing the wealth of knowledge

To help share the value and ease the challenges of PET imaging for drug development with customers, GE Healthcare offers educational opportunities through Imanet Academy, an annual three-day workshop hosted by the Uppsala Center. The Academy faculty joins top Imanet specialists in imaging and drug development with leading academic experts to create an outstanding, hands-on program of professional development. To learn more about Imanet Academy, please contact: info@ uppsala.imanet.se or visit our website: www. uppsala.imanet.se/education_eng.asp.



More companies accelerate drug discovery and development by collaborating with GE on advanced molecular imaging.

GE's pharma connection

No pharmaceutical or biotechnology company advances to the medical forefront without welcoming and adopting new technologies, yet no company can be expert in every technology. This is why strategic technology alliances are so important in discovering and developing new medicines. In molecular imaging, GE Healthcare is one of the most sought after collaborator in the field. Clinical and pre-clinical research collaborations enable GE's partners to advance toward their goals as GE advances toward its goal of diagnosing serious illnesses in their earliest stages, when options for effective treatment are greatest. Here are a few examples of GE Healthcare research partnerships.

Roche

One of the great challenges in developing treatments for Alzheimer's disease (AD) is diagnosis. Physicians sometimes have difficulty in distinguishing AD from other memory disorders. But a major diagnostic breakthrough may be at hand. Beta-amyloid, a peptide deposited in brain plaques associated with AD, can now be measured using positron emission tomography (PET) and a GE-licensed diagnostic imaging agent called Pittsburgh compound B, PIB. (See the article on PIB research on page 22.)

F. Hoffman-La Roche Ltd's Roche Pharmaceuticals of Basel, Switzerland is partnering with GE to improve AD care. In clinical trials, GE is using PIB PET scans to monitor how brain amyloid levels change in response to an anti-amyloid drug candidate developed by Roche. "This collaboration is an early step in experimental medicine," says **Peter Hug**, Roche's global head of Pharma Partnering. "GE's innovative technology allows Roche to test the efficacy of our product more accurately than was previously possible, which will help us efficiently advance through clinical development, potentially helping patients sooner."

Eli Lilly

A research partnership formed by GE and Eli Lilly and Company, Indianapolis, IN also aims to improve AD therapy. The agreement gives GE access to Lilly's vast molecule libraries in order to search for the next generation of targeted AD diagnostics beyond PIB. In particular, GE and Lilly are exploring ways to detect neurotoxic forms of beta-amyloid that are proposed to form prior to plaque formation in the brain.

"We are confident that this collaboration will result in a definitive molecular diagnostic

for this disease that has been long overdue," says **Michael Montalto**, Advanced Technology leader, Molecular Imaging at GE Global Research. GE's and Lilly's ambitious goal is one of the greatest in AD research, Montalto declares, "to develop a molecular diagnostic to determine objectively if someone has the disease prior to observed mental impairment." Diagnosing AD before memory damage occurs will set the stage to revolutionizing treatment of the disease.

The GE Healthcare and Eli Lilly collaboration will also help GE develop molecular diagnostics for Parkinson's disease and other neurological disorders. For its part, Lilly will be free to use for drug discovery and development any diagnostics GE develops through the partnership.

TGen

Located in Phoenix, AZ, the Translational Genomics Research Institute (TGen) aims to translate discoveries from the Human Genome Project into early diagnoses and smarter treatments for cancer, diabetes, and neurological disorders. A vital part of TGen's research program will be its high-throughput cellular analysis program featuring GE's IN Cell Analyzers 3000 and 1000. TGen's cellular analysis program is being created in partnership with GE.

"The advanced imaging systems provided by GE will allow us to observe cellular morphology more clearly, perform cytometry at an unprecedented rate, and more accurately collect multi-parametric information about how cells respond to specific genetic perturbations and drug exposures," says **Spyro Mousses**, director of Pharmaceutical Genomics and Cancer Drug Development at TGen. "This collaboration could result in better understanding of the biological mechanisms involved in oncology, many of which are not well understood by the medical community."

For more information

To inquire about collaborations with GE to accelerate your company's diagnostic or drug development program, contact: Kim Gallagher, head of External Scientific Affairs, GE Healthcare at kim.gallagher@ge.com.

