

the genetic resources
core
facility

Catalog of Research Services

Fall 2011

<http://grcf.jhmi.edu>



DNA Services

Genotyping

Live Cells

Methylation

Sequencing

Special
Services



JOHNS HOPKINS
MEDICINE

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Dear Researchers,

The Genetic Resources Core Facility (GRCF) is a Johns Hopkins service center providing research expertise, products, and services for the study of the human genome. At the leading edge of technology, the GRCF provides sophisticated tools and equipment oftentimes not available in the individual research lab.

The GRCF includes the Core Store and five Research Services. These units work together to streamline services such as sample collection, cell line establishment, cell line authentication, cryogenic storage, DNA isolation, oligo and gene synthesis, methylation testing, both Sanger and next-gen sequencing as well as genotyping from handfuls to millions of variants. The GRCF can also help with project design and custom assay development for DNA based studies. Additionally, the GRCF sponsors various educational programs, product seminars and an annual symposium to bring new GRCF technologies to the attention of the researcher.

We encourage investigators planning a study to meet with us to discuss your objectives. In many instances we can propose a range of possible approaches and may be able to point you to particular funding opportunities. We are also happy to write letters of support for grant applications that can demonstrate to reviewers that the resources for your study are available at the university

Finally, thank you for your support of the GRCF. As you may know we do not receive institutional funding and depend on you, our colleagues, for the support that keeps our services available. We welcome your suggestions for improvements and look forward to being an asset to the Hopkins community for many years to come.

Sincerely,

The Faculty and Staff of the
Genetic Resources Core Facility

Genetic Resources Core Facility

Research Services

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The Genetic Resources Core Facility

The Genetic Resources Core Facility is a JHU service center including the Core Store and five Research Services. Collectively, these divisions produce a number of products and services to aid researchers performing studies in molecular biology and genetics. It is our mission to provide solutions to the everyday challenges of laboratory research. Additionally, the GRCF sponsors various educational programs, product seminars and an annual symposium.

Core Store provides one-stop shopping for more than 100,000 products from 16 of the leading life science companies. In addition to its product offering the store charges no shipping and handling fees and has free delivery to three campuses East Baltimore, Bayview and Homewood. There is also convenient 24/7 access to several hundred products via the Core Store 24/7 at these locations Blalock 1026, CRB II LB-06 and the Asthma and Allergy Building 1st floor. For more information go to jhucoystore.com

Core Research Service Divisions

Cell Center & Biorepository facilitates basic scientific research by providing expertise and service in all mammalian cell culture. For more information go to <http://cellcenter.grcf.jhmi.edu>

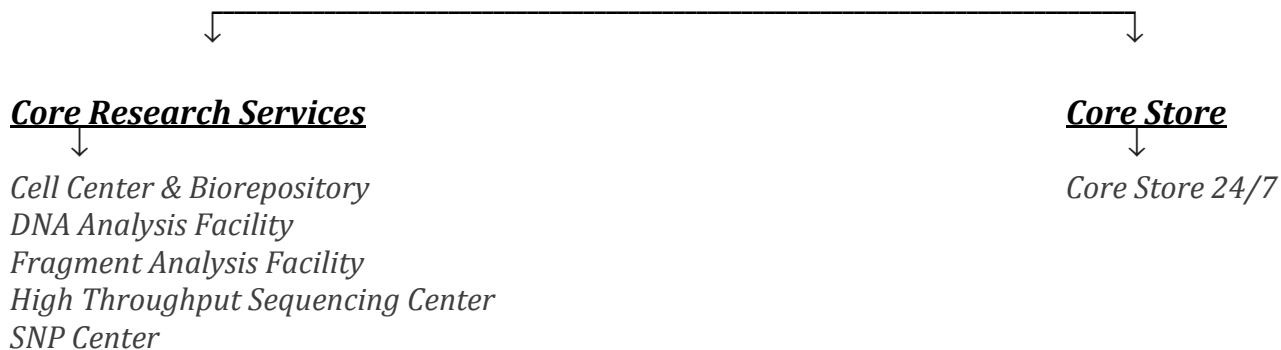
DNA Analysis Facility provides on-site same day or next day Sanger-based sequencing, low cost Oligonucleotide synthesis through a partnership with Sigma-Genosys, access to a self-service Applied Biosystems 7900 machine for Real-time PCR applications, and easy ordering of siRNAs, miRNAs and qPCR primers from QIAGEN. For more information please go to <http://daf.jhmi.edu>

Fragment Analysis Facility provides genomic DNA isolation, low throughput genotyping including SNP, STR and VNTR analysis, cell line authentication, mycoplasma testing, whole genome amplification, sample plating, bisulfite conversion, and DNA storage. For more information go to <http://faf.grcf.jhmi.edu>

High Throughput Sequencing Center features an Illumina Genetic Analyzer II, which has the capability to generate sequences with high accuracy at an extremely low cost per base. Using highly parallel sequencing-by-synthesis chemistry, billions of bases are produced with each run at a cost of less than 1% of capillary based methods. Free project consultation is available. For more information go to <http://grcf.jhmi.edu/hts>

SNP Center provides high throughput genotyping services using the Illumina BeadArray™ technology to both the JHU and larger scientific communities. The lab has the capacity to produce millions of genotypes on hundreds of samples each week. For more information go to <http://snpcenter.grcf.jhmi.edu>

Genetic Resources Core Facility



Cross reference table of product/service to the Core Research Service Division

Product	Core Research Service Division
Dry Ice	Cell Center & Biorepository
Oligonucleotides	DNA Analysis Facility
Modified Primers and Specialty Probes	DNA Analysis Facility
QIAGEN siRNA assays, miRNA assays, Q-PCR primer & optimized genes	DNA Analysis Facility
RNA Oligonucleotides and siRNAs	DNA Analysis Facility
Predesigned siRNA/shRNA	DNA Analysis Facility
Taqman Assays	DNA Analysis Facility
Service	
DNA Services	
DNA Purification	Fragment Analysis Facility
Sample Plating	Fragment Analysis Facility
Storage	Fragment Analysis Facility
Genotyping	
Specialized Content Products	SNP Center
Custom Genotyping	SNP Center
Genome-Wide Association	SNP Center
Mouse Genotyping	SNP Center
Live Cells	
Cell Line Profiling by STR Analysis (Cell Line Authentication)	Fragment Analysis Facility
Mycoplasma Detection	Fragment Analysis Facility
Mycoplasma and STR Profiling Analysis	Fragment Analysis Facility
Blood Processing and Cell Line Establishment	Cell Center & Biorepository
Culture Expansion for Experimentation or Banking	Cell Center & Biorepository
Culture Expansion for DNA or RNA Isolation	Cell Center & Biorepository
Biopsy Processing & Cell Line Establishment	Cell Center & Biorepository
Cell Banking & Repository Services	Cell Center & Biorepository
Methylation	
Analysis via Genotyping	SNP Center
Analysis via High Throughput Sequencing	SNP Center
Analysis via Pyrosequencing	SNP Center
Sequencing	
High Throughput Sequencing	High Throughput Sequencing Center
Whole Exome/Targeted Sequencing	High Throughput Sequencing Center
Whole Genome Sequencing	High Throughput Sequencing Center
Pyrosequencing	DNA Analysis Facility
Sanger Sequencing	DNA Analysis Facility
Special Services	
Bisulfite Conversion	Fragment Analysis Facility
Self Service Real Time PCR Equipment	DNA Analysis Facility
Whole Genome Amplification	Fragment Analysis Facility

Research Service Divisions Quick Reference

<i>Core Research Service Division</i>	<i>Location</i>	<i>Website</i>	<i>Phone #</i>
Cell Center & Biorepository	Blalock 1017	http://cellcenter.grcf.jhmi.edu	410-955-3320
DNA Analysis Facility	Blalock 1004	http://daf.jhmi.edu	410-955-2836
Fragment Analysis Facility	2760 Lighthouse Point East, Suite 201	http://faf.grcf.jhmi.edu	410-614-3830
High Throughput Sequencing Center	Bayview	http://grcf.jhmi.edu/hts	410-550-0371
SNP Center	Blalock 1004	http://snpcenter.grcf.jhmi.edu	410-614-0702

Notifications:

Core Research Products/Services are for research purposes only.

Pricing of products and services are subject to change. For the most current pricing please visit our website at <http://grcf.jhmi.edu>.

Products

Core Store

The Core store offers more than 100,000 products from the following suppliers:

<i>Agilent Technologies</i>	<i>Hyclone Laboratories</i>	<i>QIAGEN</i>
<i>Applied Biosystems</i>	<i>Invitrogen</i>	<i>Quality Biological</i>
<i>Bio-Rad</i>	<i>Mediatech</i>	<i>Roche Applied Science</i>
<i>Cell Signaling Technology</i>	<i>New England Biolabs</i>	<i>Sigma</i>
<i>Faster Better Media</i>	<i>Perkin Elmer Health Sciences</i>	<i>Thermo Scientific - Fermentas</i>
<i>GE Healthcare</i>	<i>Promega Corporation</i>	

For a complete listing of products and pricing, go to jhucoystore.com.

Dry Ice

The Cell Center offers self-serve dry ice at Blalock 1010A (outside the Core Store) from 8:30 a.m. - 4:20 p.m., Monday - Friday.

Product	Price
Dry Ice	\$2.00/lb

For more information, go to <http://cellcenter.grcf.jhmi.edu> or call 410-614-5201

Gene Synthesis

DNA synthesis technology now allows entire genes to be synthesized. This can be helpful for difficult to clone sequences or for the construction of specific mutations. Custom genes are delivered in standard vectors, but may be ordered in custom vectors for an additional charge. Minimum yield is 2 µg of plasmid.

Genes may be ordered from Bioneer and IDT through the Johns Hopkins University portals:

Bioneer: <http://us.bioneer.com/jhu/>

IDT: <http://www.idtdna.com/JohnsHopkins/Login.aspx>

Both companies adhere to the International Gene Synthesis Consortium's protocols and screen the sequences to identify regulated and potentially dangerous pathogen sequences.

For more information, call 410-955-2836

Bioneer	Price
Up to 3 kb	\$0.39/base (Min \$180)
>3000	Please inquire for pricing

IDT	Price
Mini-genes <400 bp	\$198.00 (flat fee)
Genes (401-1500 bp)	\$.50/base
>1500	Please inquire for pricing

Oligonucleotides

The DNA Analysis Facility offers the synthesis of oligonucleotides through several vendors, including Bioneer, IDT, Operon and Sigma-Genosys. Ordering through the Johns Hopkins University portal lets you take advantage of lower pricing and free shipping. Oligos can be delivered to your lab for free or picked up in our office in Blalock 1004.

The Johns Hopkins portals specific to each company are listed below:

Bioneer's portal: <http://us.bioneer.com/jhu/>
 IDT's portal: <http://www.idtdna.com/JohnsHopkins/Login.aspx>
 Operon (Fisher): coming soon
 Sigma's portal: <http://www.sigmaldrich.com/configurator/servlet/DesignCenter>

Please note that you must create a new username and password for each company, even if you have been ordering through them from their standard web site. If you don't, you will not receive the discounted pricing below. Specialized quotes from sales representatives cannot be order through these portals.

Comparison charts of pricing, size limitations and guaranteed minimum yields are below to help you select a company. Prices listed below are for standard, unmodified oligos, with standard turn around times (48 hours), delivered in lyophilized in tubes. Each company also offers "same day" service, which means that oligos are synthesized and shipped the same day. Same day orders are not eligible for free shipping. See each company's portal for pricing.

Oligo orders must be placed by 2 p.m. for standard shipping times to apply.

Standard Oligos in tubes, price per base

Company	Synthesis Scale					
	25 nmole*	50 nmole*	100 nmole*	200 nmole*	250 nmole*	1 µmol**
Bioneer	\$0.15	\$0.23	N/A	\$0.56	N/A	\$1.00
IDT	\$0.15	N/A	\$0.36	N/A	\$0.58	\$0.96
Operon	\$0.15	\$0.25	N/A	\$0.58	N/A	\$0.96
Sigma-Genosys	\$0.15	\$0.23	N/A	\$0.53	N/A	\$1.00

*See table below for size limitations

**Larger quantities available from all companies, please call 410-955-2836 for pricing.

Size limitations

Company	Synthesis Scale					
	25 nmole	50 nmole	100 nmole	200 nmole	250 nmole	1 µmol
Bioneer	15-60 mer	10-75 mer	N/A	5-100 mer	N/A	5-130 mer
IDT	15-60 mer*	N/A	10-90 mer	N/A	5-100 mer	5-100 mer
Operon	5-60 mer	5-90 mer	N/A	5-125 mer	N/A	5-100 mer
Sigma-Genosys	<51 mer*	<111 mer	N/A	<111 mer	N/A	<131 mer**

*Cannot be purified or modified

**Oligos between 111-130 bases cannot be purified and yield is not guaranteed

Guaranteed Minimum Yield

Company	Synthesis Scale					
	25 nmole	50 nmole	100 nmole	200 nmole	250 nmole	1 µmol*
Bioneer*	2 OD	4 OD	N/A	8 OD	N/A	29 OD
IDT	3 OD	N/A	6 OD	N/A	15 OD	45 OD
Operon	3 OD	4 OD	N/A	11 OD	N/A	36 OD
Sigma-Genosys	3 OD	5 OD	N/A	12 OD	N/A	40 OD

*All Bioneer oligos are RP1 purified, standard

Long Oligos

Bioneer and IDT offer long oligos up to 200 bp in length. Bioneer's Extendamers can be 130-200 bases long. IDT's Ultramers can be 60-200 bases long. Extendamers and Ultramers can be PAGE purified for an additional fee. Purification will lower yield.

Price per base

Product	Synthesis Yield		Purification
	3 - 4 nmole	20 nmole	
Extendamer (Bioneer)	\$0.86*	N/A	\$75.00 additional
Ultramer (IDT)	\$0.68	\$1.35	\$94.50 additional

*RP1 purification is standard on all Extendamers

Purification*

There are three methods of purification: RP1 Cartridge (standard for Bioneer, not available from IDT), HPLC and PAGE. All purification methods reduce the amount of oligo returned. Purification method must be selected during the ordering process. Purification adds 2-4 days to delivery time, depending on method selected.

Company	Type	Synthesis Scale					
		25 nmole	50 nmole	100 nmole	200 nmole	250 nmole	1 μ mol
Bioneer	RP1	Free, standard	Free, standard	N/A	Free, standard	N/A	Free, standard
	HPLC or PAGE	N/A	\$35.75	N/A	\$35.75	N/A	\$75
IDT	RP1	N/A	N/A	N/A	N/A	N/A	N/A
	HPLC or PAGE	N/A	N/A	\$30.00	N/A	\$45.50	N/A
Operon	HPSF	\$5.00	\$5.00	N/A	\$5.00	N/A	\$10.00
	Quick LC	N/A	\$26	N/A	\$43	N/A	\$78.00
	HPLC or PAGE	N/A	\$28.80	N/A	\$50	N/A	88.60
Sigma-Genosys	RP1	N/A	\$6.25	N/A	\$6.25	N/A	\$10.00
	HPLC or PAGE	N/A	\$33.75	N/A	\$33.75	N/A	\$48.75

*Desalting is free and standard on all oligos from all companies

Oligos in plates:

All companies offer large numbers of oligos in a plate format. Plates do not include free shipping.

Company	Synthesis Scale					
	25 nmole	50 nmole	100 nmole	200 nmole	250 nmole	1 μ mol
Bioneer	\$0.12	\$0.17	N/A	\$0.32	N/A	\$0.76
IDT	\$0.12	N/A	\$0.25	N/A	\$0.43	\$0.88
Operon	\$0.10	\$0.18	N/A	\$0.42	N/A	\$-.90
Sigma-Genosys	\$0.12	\$0.18	N/A	\$0.40	N/A	\$0.80

Modified Primers and Specialty Probes

Through our partnerships, we are able to offer a wide variety of specialty synthesis products, including, but not limited to:

Modifications:

- Phosphorothioate bonds
- Biotinylation (5' & 3')
- Phosphorylation (5' & 3')
- Fluorescent labels, including FAM, HEX, TET, Cy3, Cy5, and many others
- Inosine
- Deoxy-Uracil
- At least 50 others, depending on manufacturer

Probes

- DNA probes (single and dual labeled)
- LNA probes (LNA are only available as labeled probes, not as regular oligos due to licensing agreements)
- PrimeTime Assays (IDT only)
- RNA oligos, custom
- siRNA (single and duplex)
- WellRED oligos
- Molecular Beacons
- LightCycler probes
- Scorpion probes

All fluorescently labeled oligos are shipped in amber tubes to protect dye integrity. Products, quantity and availability vary by manufacturer. Price lists at <http://daf.jhmi.edu/synthesis> show the most common modifications. Others are available. Please call 410-955-2836 or check the company portals.

Delivery times for specialty oligos range from 3 to 10 days.

QIAGEN Geneglobe Assays

All assays found on QIAGEN's Geneglobe site (<https://www.qiagen.com/geneglobe/default.aspx>) can be ordered through the DNA Analysis Facility.

Products include assays for:

- Gene silencing (siRNAs in several different formats)
- Gene expression analysis (RT-PCR primer sets)
- miRNA (detection primers, mimics, inhibitors, precursor assays, custom assay designs)
- Expression of proteins
- Next gen sequencing primers
- DNA methylation (including Pyrosequencing assays)

Order through the DNA Analysis Facility to receive a discount and free shipping on all orders! Simply go to QIAGEN's site (<https://www.qiagen.com/geneglobe/default.aspx>), fill up your shopping cart, save the cart and then e-mail it to yourself and CustomOrders@jhmi.edu *(rashwor2@jhmi.edu)* with the following information: PI name, budget (IO#) number, and contact phone number. See our downloadable flyer for more details (http://daf.jhmi.edu/downloads/jhu_geneglobe.pdf) or for more information call 410-955-2836.

RNA Oligonucleotides and siRNAs

Custom RNA Oligos

Custom RNA oligos can be ordered from Bioneer, IDT, and Sigma. Oligos must be between 7 and 45 bases in length for Sigma, 10-50 bases for IDT and cannot be ordered on the 25 nmole scale for any company. They may be purified via HPLC or PAGE for an additional fee. Some modifications are available, see the individual portals for details. Bioneer sells their oligos by total yield. See separate chart for pricing. Bioneer RNA can only be purified by HPLC for an additional fee.

RNA oligos usually arrive six business days after ordering purified oligos take longer. For more information, see the company portals. Links to the portals are on our website: <http://daf.jhmi.edu/>.

RNA Oligos	IDT			Sigma		
	100 nmole	250 nmole	1 μ mole	50 nmole	200 nmole	1 μ mol
RNA Bases (per base)	\$5.69	\$7.44	\$15.75	\$2.82	\$3.62	\$9.66
2'O-me Bases (per base)				\$4.83	\$5.64	\$11.27

Bioneer RNA oligos	Price per base			
RNA length	10 nmole*	20 nmole	50 nmole	100 nmole
<30 bases	\$2.79	\$4.65	\$7.44	\$12.09
31-35 mer	\$4.19	\$6.98	\$11.16	\$18.14
2'O-me Bases	\$3.72	\$4.44	\$7.96	\$14.36
HPLC purification	\$40.00	\$50.00	\$60.00	\$70.00

*Guaranteed Yield, up to 30-mer, including overhang

Custom siRNA

Custom siRNAs can be used in cell culture experiments to silence genes. They can be ordered Simplex or Duplex, from Bioneer, IDT and Sigma. An optional overhang can be included. siRNAs must be between 19 and 30 bases in length. Pricing is a flat fee, Purification via HPLC or PAGE is extra. siRNAs typically arrive 7 business days after ordering. Modifications, including 2'O-me bases and Locked Nucleic acids are available. For details on ordering, see the company portals on our website: <http://daf.jhmi.edu/syntheis>.

siRNA	Sigma		
	2 OD	5 OD	10 OD
Unlabelled Simplex	\$68.43	\$110.29	\$132.83
Unlabelled Duplex	\$120.75	\$201.25	\$241.50

siRNA	IDT	
	2 nmole	10 nmole
Unlabelled Duplex	\$81.00	\$126.00

Bioneer siRNA oligos	Price per base					
	1 nmole*	5 nmole	10 nmole	20 nmole	50 nmole	100 nmole
Unlabelled Duplex (RP1)	\$50.00	\$95.00	\$210.00	\$260.00	\$410.00	\$440.00
Unlabelled Duplex (HPLC)	\$90.00	\$170.00	\$330.00	\$440.00	\$530.00	\$570.00

* Gaurenteed Yield, up to 30-mer, including overhang

Predesigned siRNA/shRNA

Bioneer and Sigma offer many predesigned siRNA assays. Sigma also offers shRNA. Please see their portals for details and pricing.

Taqman Assays

Applied Biosystems custom products are now available through the DNA Analysis Facility. Order through the DNA Analysis Facility to receive small discount and free shipping on all orders! Orders can be delivered to you lab for free or picked up in our office in Blalock 1004. Products available include:

- Taqman Gene Expression Assays, Plates and Arrays
- TaqMan MicroRNA Assays
- TaqMan SNP Genotyping
- TaqMan CNV Assays

A list of types of assays available can be found on our website at: <http://daf.jhmi.edu/Taqman>

To place your order, please e-mail the following information to customorders@jhmi.edu:

- Your name
- E-mail address
- PI name
- Phone number
- Building & Room number
- Budget number
- Assay ID
- Part number
- Product description or gene name

For help with assay selection, please contact JV Vandergrift, the local AB Real-time sales representative: 215-498-3957. For questions or more information, please see our website: <http://daf.jhmi.edu/Taqman> or call 410-955-2836.

DNA Services

DNA purification from:

Whole blood

Buffy Coat

Packed Cells

Cultured Cells

Blood spot

FFPE Samples

Buccal Swabs/Brushes

Mouthwash

Oragene Saliva Collection Kits

Purification is carried out using either Puregene kit reagents (QIAGEN) on an Autopure automated workstation or using QIAGEN column based kits on a QIACube automated workstation. A260 and A280 readings are determined using a Nanodrop spectrophotometer. Samples are returned to the client or may be stored at the FAF. Average DNA yield from 1 ml fresh whole blood is 28µg. Average DNA yield from one buccal swab is 1-2µg. DNA is suitable for PCR, Southern blotting, and other applications requiring high molecular weight DNA

Prices range from \$25 to \$45 per sample. Discounts are given for large projects.

For more information and pricing go to <http://faf.grcf.jhmi.edu> or call 410-614-3830.

Sample Plating

Sample plating includes organization of samples, diluting DNA to a specified concentration, and aliquoting samples into 96-well plates. Pricing is per 96-well plate.

For more information and pricing go to <http://faf.grcf.jhmi.edu> or call 410-614-3830.

Storage

-20°C and -80°C DNA Storage

Freezers are available for -20°C and -80°C DNA Storage. Pricing ranges from 100-place boxes for smaller projects to entire freezers for larger storage needs. Sample dispensing and shipment is also available.

For more information and pricing go to <http://faf.grcf.jhmi.edu> or call 410-614-3830.

Genotyping

The Genetics Resources Core Facility offers several different methods of genotyping through its various divisions. We feature high throughput genotyping on the Illumina platform and lower throughput genotyping via TaqMan®, Pyrosequencing and STR/VNTR analysis. Self-service access to two Applied Biosystems 7900HT is also available for those who wish to do real time PCR experiments, but don't have their own machine..

The SNP Center features Illumina's BeadArray™ technology, a robust, flexible system that enables the analysis of a large number (1,000's) of genotypes using a relatively small quantity of DNA. The BeadLab™ combines robotics, high-multiplex assay protocols, multi-array matrices, scanning instruments, LIMS, and automated allele-calling software to deliver high-confidence, highly accurate genotypes. Access to this technology is available fee-for-service, or for free via an application process through the CIDR mechanism. To apply to CIDR, you must have grant support through one of the fourteen member NIH institutes. CIDR also requires a written application whose details are available at the web site: <http://www.CIDR.jhmi.edu>.

Specialized Content Products

Cancer Chip, ImmunoChip, MetaboChip

Each of these panels contains SNPs of interest to their respective fields. These chips were each developed by a consortium of investigators that controls access to the chips. To use these chips, you must first apply to the consortia, receive permission, and then we can order the chips for you. For information on contacting the consortia, please contact us. Prices for these chips do not include pretesting.

Product	Number of SNPs	Price/ Sample (1/2 - 20+ plates)	Minimum Sample Number
Specialty chip	Varies by chip type	\$87 - 475	46

DNA Fingerprinting Panels

These panels of 96 SNPs have been designed by CIDR with enough polymorphic SNPs to identify samples. One panel has overlap with all of Illumina's GWAS products, the other overlaps with Affymetrix's 6.0 genotyping product. This panel can be used in several ways: 1) as a record of the original genotypes of a sample that may be stored for long periods of time or frequently distributed to other investigators, to help avoid sample mix-ups; 2) as a way of identifying cell lines prior to transformation and passage, to help meet the NIH's new guidelines for cell line authentication; 3) as a pretest for samples of uncertain quality, prior to more extensive genotyping; 4) as a way of insuring that serial samples collected from individuals are indeed from the same individual.

Product	Number of SNPs	Price/Sample	Minimum Sample Number
DNA Fingerprinting w/genotypes returned	96	\$45.00	1 - Sample numbers less than 90 will be held until they can be combined with other studies
DNA Fingerprinting, no genotypes returned	96	\$25.00	1 - Samples numbers less than 90 will be held until they can be combined with other studies

DNA Test Panel

This panel serves a two-fold purpose. It can be used to pre-screen DNA samples for assay performance before conducting large studies or it can be used to look at population stratification in a set of samples. The panel contains 360 SNPs, thoroughly screened and selected from Illumina's Linkage IVb Panel, distributed across the genome. To see the list of SNPs and other details, go to http://snpcenter.grcf.jhmi.edu/fixed_gg.html.

<i>Product</i>	<i>Number of SNPs</i>	<i>Price/ Plate</i>	<i>Minimum Sample Number</i>
DNA Test Panel	360	\$6,300.00	90

Human Cyto BeadChip

The HumanCytoSNP-12 BeadChip is designed to scan the whole genome in an efficient, high-throughput analysis of genetic and structural variations that are most relevant to human disease. Resolution is better than with FISH or CGH. The chip can be used to detect duplications, deletions, amplifications, copy-neutral LOH and mosaics.

<i>Product</i>	<i>Number of SNPs</i>	<i>Price/ Sample (1/2 – 20+ plates)</i>	<i>Minimum Sample Number</i>
Human Cyto Beadchip	220,000	\$225 -\$195	46

Human Exome Chip

Detailed information on this chip is not available at this time, but the chip is expected to cover SNPs across the exons of the human genome. Orders placed prior to Oct. 15 will receive a substantial discount from the prices listed below. Watch our website for more details and a final SNP list.

<i>Product</i>	<i>Number of SNPs</i>	<i>Price/ Sample</i>	<i>Minimum Sample Number</i>
Exome Chip		\$103	46

Human Whole Genome Linkage Panel*

This is a panel of about 6,000 highly informative SNPs, evenly distributed across the human genome, with an average genetic distance between SNPs of 0.64 cM. The average physical gap is 482 kb (median of 298 kb) between each marker. For more details and a list of SNPs, go to http://snpcenter.grcf.jhmi.edu/fixed_gg.html.

*** Note:** This product is being discontinued by Illumina. We will offer it at this pricing as long as supplies are available. When the supplies run out, it will be available only as a custom synthesis for projects with 1000 or more samples, at custom synthesis pricing.

<i>Product</i>	<i>Number of SNPs</i>	<i>Price/ Sample</i>	<i>Minimum Sample Number</i>
Human Whole Genome	6,090	\$200.00	46

Custom Genotyping

High Throughput Custom Genotyping via Illumina Products

SNP panels may be tailored to your specific research needs. Two different chemistries are used depending on the number of SNPs to be assayed. Lower numbers of SNPs are generally assayed using the Golden Gate chemistry SNPs numbering over 6000 are generally assayed using the Infinium chemistry. For more information, please see our website: http://snpcenter.grcf.jhmi.edu/custom_genotyping.html or call 410-614-0702. Pricing is dependent on the number of samples being genotyped as well as the number of SNPs. Plates contain 90 unique samples. Pricing includes two cross-plate duplicates and four HapMap controls per plate. Oligos must be ordered through our facility.

#of SNPs	Genotyping Cost per plate (1plate - 10+ plates)	Oligo Costs
48	\$6,800 - \$3,500	Included in genotyping
96	\$7,500 - \$3,800	Included in genotyping
144	\$9,500 - \$4,200	Included in genotyping
192	\$11,500 - \$4,700	Included in genotyping
348	\$17,500 - \$5,000	Included in genotyping
768 or 1536	\$6,500 <21 plates	Additional, call for quote
	\$5,500 >20 plates	
3072*	\$8,000 <21 plates	Additional, call for quote
	\$7,000 >20 plates	
6000+	Call for quote	Included in genotyping

*Pricing is for Golden Gate genotyping. For projects with more than 11 plates, please consult with SNP Center staff to see if your project would be cheaper or work better with Infinium chemistry.

Low Throughput Custom Genotyping (SNP, STR, VNTR Analysis)

The Fragment Analysis Facility offers low throughput custom genotyping of SNPs, VNTRs and STRs, and SNP discovery by DNA sequencing.

SNP detection is by TaqMan® analysis with custom or predesigned kits on a 7900HT PCR System (Applied Biosystems) or sequencing of polymerase chain reaction (PCR) products on a 3730XL DNA Analyzer (Applied Biosystems). Detection of SNPs via the Qiagen Pyromark24 system is also possible for particularly difficult cases.

VNTR and STR analysis is offered at two levels of service, full and limited. Full service fragment analysis includes ordering and developing STR or VNTR primers, polymerase chain reaction (PCR) of genomic DNA or WGA samples, and fragment sizing on either an Applied Biosystems 3730XL DNA Analyzer with GeneMapper software or by agarose gel electrophoresis. Limited service includes just the sizing and analysis.

Pricing is project based. Please contact us for a quote. For more information about genotyping services go to <http://faf.grcf.jhmi.edu> or call 410-614-3830

Genome Wide Association

We offer all of Illumina's genome wide association products. Samples must be sent in ½ plate increments. This product line and pricing is constantly changing. Listed here are products and pricing as of August 2011. Please see our website for current products and pricing: <http://snpcenter.grcf.jhmi.edu/gwa.html> or call 410-614-0702 for a quote. SNP lists and detailed content for all products are also available on the website.

Human Omni Express BeadChip

This product genotypes 700,000+ SNPs, gleaned from all three HapMap phases. It is targeted for Caucasian and Asian populations and supports CNV applications. The SNP list has a 95% overlap between the Human Omni1 chip. This chip can also be run using a special protocol from Illumina, which will restore DNA badly damaged by the FFPE process.

Human Omni1-Quad BeadChip

This product has more than one million SNPs. It contains markers for more than 11,000 CNV regions, with a 1.5 kb median marker spacing within those regions. It also features new content from the 1,000 Genomes project--55,000 non-synonymous & splice site SNPs, 18,000 SNPs in four 1Mb regions with GWAS signals for three or more disease traits. There is a 60% overlap in SNPs between this chip and the 1M-Duo.

Human Omni1S BeadChip

The Omni 1S chip contains all of the SNPs that were added to the Omni 1-Quad chip to create the Omni 2.5 chip. It is designed to allow investigators who have already done studies using the Omni1 chip to "catch up" to the latest chip in a cost effective manner, by genotyping only the missing SNPs.

Human Omni2.5-8 BeadChip

This product is Illumina's latest chip and has 2.45 million SNPs. It offers a comprehensive set of both common and rare SNP content from the 1000 genome project, and is designed to analyze diverse world populations. Mean SNP spacing is 1.18 kb, and 1.2 million of the SNPs are within 10 Kb of a RefSeq gene.

Human Omni 2.5S BeadChip

The Omni 2.5S chip contains all of the SNPs that were added to the Omni 2.5 chip to create the Omni 5 chip. It is designed to allow investigators who have already done studies using the Omni1 chip to "catch up" to the latest chip in a cost effective manner, by genotyping only the missing SNPs.

Human Omni5-Quad BeadChip

The HumanOmni5 BeadChip uses tagSNPs selected from the international HapMap and 1000 Genomes Projects, targeting variation down to 1% minor allele frequency. Up to 500K custom markers can be added to this chip, allowing it to be tailored to your specific research interests. Mean SNP spacing on the chip is 0.68 kb, and 2.3 million SNPs are within 10kb of a RefSeq gene.

Product	Price/Sample (1/2 plate - 20+ plates)
Omni Express	\$384 - \$330
Omni Express + FFPE Restore	\$510 - \$420
Omni1-Quad	\$510 - \$420
Omni 1S	\$293 - \$248
Omni2.5-8	\$640 - \$550
Omni2.5S	\$415-\$360
Omni5	\$896 - \$550

Mouse Genotyping

There are two Mouse Linkage Panels available: the Low Density Linkage and the Medium Density Linkage. Both panels are designed for use to identify quantitative trait loci (QTL) and candidate gene mapping. The SNPs for the panels were chosen from the Welcome-CTC Mouse Strain SNP Genotype Set at <http://www.well.ox.ac.uk/mouse/INBREDS/>. For a fact sheet comparing both panels, details on coverage and SNP lists go to http://snpcenter.grcf.jhmi.edu/mouse_genotyping.html.

The Low Density Panel

This panel consists of 377 loci, optimized for application to N2 & F2 mouse genetic crosses. These can be used for QTL mapping.

The Medium Density Panel

This panel consists of 1,449 loci, optimized for various mapping applications including characterization of transgenic, congenic & knockout animals, and genetic mapping in advanced intercross mouse lines.

Product	Number of SNPs	Price/ Plate	Minimum Sample Number
Mouse Low Density Linkage	377	\$6,300.00	82
Mouse Medium Density Linkage	1,449	\$7,800.00	82

Custom Mouse Genotyping panels

Custom Mouse panels can be created, using the SNPs listed on the Welcome-CTC website, <http://www.well.ox.ac.uk/mouse/INBREDS/>. Pricing is the same as for other custom genotyping. See price list on page 17.

Live Cells

Quality Control of Cell Lines

Cell Line Profiling by STR Analysis (Cell Line Authentication)

In light of the NIH's recommendation that all cell lines be authenticated before publication, we offer a short tandem repeat (STR) profiling service using two commercially available kits. The profile generated can be used to confirm the identity of an acquired line by comparison to a known profile, or to establish an identity profile for a cell line created locally.

General recommendations are to authenticate when a new line is established or acquired to determine an identity for the cell line. Cells should be authenticated again before freezing, once every two months that the culture is actively growing, if the performance of the line is not consistent or results are unexpected, and before publication. If using more than one cell line in the lab, all lines should be initially tested to rule out cross contamination.

The FAF accepts purified DNA or frozen cell pellets for analysis (a DNA isolation charge applies when submitting cell pellets). STR profiling is available using Promega's StemElite ID System or Applied Biosystems' AmpFLSTR Identifier PCR Amplification Kit. These kits are only suitable for cell lines of human origin. For a list of STR markers included in each kit please see <http://faf.grcf.jhmi.edu/str.html>.

For additional information, ordering instructions and request forms please go to <http://faf.grcf.jhmi.edu/str.html>

STR Analysis	Price
StemElite	\$80.00/sample
Identifier	\$110/sample

Product	Price
DNA Isolation	\$25.00/sample

Mycoplasma Detection

Tissue cell cultures can become contaminated by mycoplasma that is often not visible, jeopardizing research. Mycoplasmas can cause alterations in cell growth and metabolism, or induce morphological changes or chromosomal abnormalities. Routine screening of established or continuously growing cell lines is strongly advised. Potential sources of contamination are laboratory personnel, contaminated products used for cell culture, or exposure to contaminated cultures.

The Core mycoplasma test uses PCR amplification of the conserved 16S - 23S intergenic spacer region of ribosomal RNA with a highly conserved fluorescent primer pair. The amplified fragments are then hybridized to a MycoDtect DNA-array (Greiner, Bio-One). A universal mycoplasma DNA-probe tests for the presence of ALL mycoplasma species, while species-specific probes detect nine of the most common mycoplasma. Species identification can help to identify and treat the source of contamination.

Testing for Mycoplasma contamination is recommended on a regular basis, and before cell banking and cryopreservation.

Service	Price
Mycoplasma testing	\$60.00/sample

For more information, ordering instruction and request forms go to <http://faf.grcf.jhmi.edu/mycoplasma.html>

Mycoplasma and STR Profiling Analysis Combined (kit dependent)

Submit one cell pellet for both mycoplasma and STR profiling (cell line authentication) analysis and save 10%.

<i>Kit</i>	<i>Price</i>
Stem Elite plus mycoplasma testing	\$126.00/sample
Identifier plus mycoplasma testing	\$153.00/sample

Please see our website, <http://faf.grcf.jhmi.edu> for more information about STR profiling of cell lines

Blood Processing & Cell Line Establishment

Blood separation w/isolation, aliquoting, and cryopreservation of sera or plasma. Service includes blood separation, aliquoting, and cryostorage of sera or plasma with electronic sample tracking. Cryopreserved sera (Red-top vacutainer) or plasma (Purple/Yellow-top vacutainer) proteins are intact for future analysis. Same-day service.

<i>Service</i>	<i>Price</i>
Blood Separation + Plasma isolation + aliquoting + cryopreservation (3@ 1mL vials)	\$15.75
Cryopreservation of additional vials of sera or plasma (per 1mL vial)	\$5.25

Blood separation w/isolation and cryopreservation of viable lymphocytes. Service includes blood separation (ACD tube) by ficoll gradient + lymphocyte isolation, cell count, viability determination, cryopreservation of 1 ml vial whole blood, 1-4 vials of isolated lymphocytes (@ 5×10^6 cells), and electronic sample tracking. Cryopreserved lymphocytes are suitable for future transformation. Same-day service.

<i>Service</i>	<i>Price</i>
Blood Separation + Lymphocyte isolation + cryopreservation (@ 5×10^6 cells)	\$105.00

Transformation of blood lymphocytes. Service includes B-cell transformation from freshly isolated blood lymphocytes, culture expansion, and cryopreservation of lymphoblasts. Specifically includes: blood separation by ficoll gradient, isolation of lymphocytes, transformation with Epstein Barr virus, cryopreservation of 1 vial of whole blood (1 ml), 1-2 vials of lymphocytes (@ 5×10^6 cells), cryopreservation of transformed lymphoblasts (@ 5×10^6 cells) and electronic sample tracking. Allow 8-10 weeks for completion.

<i>Service</i>	<i>Price</i>
Blood separation + Lymphoblast cell line establishment	
+2 x 10^7 cryopreserved, lymphoblasts (4 vials@ 5×10^6) + 1 x 10^8 non-viable pellet	\$505.00
+2 x 10^7 cryopreserved, lymphoblasts (4 vials@ 5×10^6)	\$305.00
+1 x 10^7 cryopreserved, lymphoblasts (2 vials@ 5×10^6)	\$280.00

Transformation of cryopreserved lymphocytes. Service includes B-cell transformation from cryopreserved blood lymphocytes, culture expansion, and cryopreservation of lymphoblasts . Specifically includes: Thaw of cryopreserved cells, count, viability determination, transformation with Epstein Barr virus, cryopreservation of (transformed) lymphoblasts (@ 5 x 10⁶ cells) and electronic sample tracking. Allow 8-10 weeks for completion.

Service	Price
Cell thaw + Lymphoblast cell line establishment	
+2 x 10 ⁷ cryopreserved, lymphoblasts (4 vials@5 x 10 ⁶) + 1 x 10 ⁸ non-viable pellet	\$400.00
+2 x 10 ⁷ cryopreserved, lymphoblasts (4 vials@5 x 10 ⁶)	\$200.00
+1 x 10 ⁷ cryopreserved, lymphoblasts (2 vials@5 x 10 ⁶)	\$175.00

Culture Expansion for Experimentation or Banking

Preparation of culture seed stocks for banking. Cultured, eukaryotic cells from your lab or outside providers (eg. ATCC) can be expanded, aliquoted, and cryopreserved in freezing media (5 x 10⁶/vial) or returned to you in T-flasks. Specialty media fee may apply.

(*Mycoplasma testing REQUIRED*)

Service	Price
Culture Expansion w/o cryopreservation (T-25 flask@ 5 x 10 ⁶ cells)	\$50.00
Culture Expansion w/ cryopreservation	
5 x 10 ⁶ viable cells for banking	\$75.00
5 x 10 ⁶ viable cells for shipping	\$100.00 - \$170.00
2 x 10 ⁷ viable cells	\$100.00

Culture Expansion for DNA or RNA isolation

Tumor (immortal) cells from the your lab or outside providers (eg. ATCC) can be expanded for nucleic acid isolation (non-viable cell pellet provided at -80oC). DNA or RNA extraction is available separately at the Fragment Analysis Facility. Specialty media fee may apply.

(*Mycoplasma testing REQUIRED*)

Service	Price
Culture Expansion for future RNA/DNA extraction	
1 x 10 ⁸ non-viable cell pellet	\$200.00

Biopsy Processing & Cell Line Establishment

Establishment of fibroblast cultures from skin biopsies. Service includes skin biopsy dissection, fibroblast cell establishment in culture, and cryopreservation of 1x10⁷cells (2 vials @ 5 x 10⁶ cells) and electronic sample tracking. Allow 8-10 weeks for completion

Service	Price
Fibroblast culture establishment from skin biopsy +Growth + cryopreservation of 1 x 10 ⁷ cells (2 vials @ 5x10 ⁶)	\$287.50
Additional vials of cryopreserved fibroblasts @ 5x10 ⁶)	\$75.00

Cell Banking/Repository Services

The GRCF BioRepository is a dedicated facility to meet all of your long-term cryostorage needs. Located at Johns Hopkins, we offer a range of frozen storage conditions for sera, plasma, and viable cells. Convenient deposit and retrieval of cryopreserved specimens is possible twice daily from our Blalock 1017 laboratory. A four-hour advance notice is requested.

Capacity

Safe and secure storage is currently available for your collection of up to 240,000 vials requiring liquid nitrogen vapor phase temperatures (-160°C) and for up to 160,000 vials requiring standard, ultra-low (-80°C) temperatures. Barcoded vials are electronically tracked using a proprietary relational database. All freezers and equipment are continuously monitored using a Rees Scientific 24-7 alarm system.

<i>Service</i>	<i>Price</i>
Annual Storage per vial (prorated for Fiscal Year)	\$1.00
Sample Retrieval	\$0.75

Methylation

Analysis via Genotyping

High throughput analysis via Illumina products:

450K Infinium Methylation BeadChip

The 450K Methylation chip is not reliant on Me-DIP (Methylated DNA immunoprecipitation). It covers all designable RefSeq genes, including promoter, 5' and 3' regions, including those without CpG islands. Additional content includes CpG islands and shores, CpG sites outside of islands, non-CpG methylated sites identified in human stem cells, differentially methylated sites from tumor vs. normal (multiple forms of cancers) and across several tissue types, CpG islands outside of coding regions, miRNA promoter regions, and disease-associated regions. 90% of the HumanMethylation 27 chip is included. Bisulfite conversion is included in pricing for projects with more than one full plate. Four PI supplied controls are assayed at no additional charge. This chip can also be run on FFPE samples using the new Illumina FFPE restoration kit. For more information, please see:

<http://snpcenter.grcf.jhmi.edu/methylation.html>

Product	Number of methylated sites	Price/Sample (1/2 plate - 1800+)	Minimum Sample Number
Human Methylation 450K	450,000+	\$525 - \$380	46
With FFPE restore		\$665 - 480	46

Custom Methylation Products

Custom Methylation assays are available for up to 384 CpG sites. Custom content can be submitted for evaluation using GeneIDs, Gene symbol, RefSeq mRNA accession numbers or GI numbers, chromosomal region or sequences. For more information, please see: <http://snpcenter.grcf.jhmi.edu/methylation.html>

Product	Number of CpG islands	Price per plate	Minimum Sample Number
Custom Methylation Panel	384	\$6,000 + cost of oligos	90

Analysis via High Throughput Sequencing

Various methods are available for analyzing methylation patterns on the Illumina HiSeq200, including ChIPSeq and direct sequencing of the bisulfite converted genome. For more information please see our website.

Pricing

Visit <http://grcf.jhmi.edu/hts> for pricing information.

Ordering

To place an order, please fill out the online form located at <http://grcf.jhmi.edu/hts/ordering.html>

Turnaround time is dependent upon the number of samples, the type of application, and instrument availability.

Due to the rapid advancement of new sequencing technologies, information is subject to change. For more information please contact David Mohr at dwmohr@jhmi.edu or 410-550-0371

Analysis via Pyrosequencing

Specific regions of methylation can be assayed via sequencing on the Pyromark Q24 system from Qiagen. Bisulfite converted DNA is PCR amplified with a biotinylated primer pair. The non-biotinylated strand is sequenced in the Pyromark system. Custom regions can be amplified, or one of the 60,000 human and mouse predesigned kits can be ordered from QIAGEN. Both primer design and analysis software is available for use by customers. For more information, please see our website: <http://daf.jhmi.edu/pyrosequencing.html> or call 410-614-0702.

Product	Price per sample
Methylation analysis	\$6.50 - \$5.00, dependent number of samples

PCR services are available through the Fragment Analysis Facility. The FAF can amplify your samples using a supplied Qiagen predesigned or custom kit. Service includes PCR of samples, amplification confirmation by agarose gel electrophoresis and submission to DAF for pyrosequencing. For more information, contact Laura Kasch (410-614-3830) or lkasch@jhmi.edu.

Bisulfite Conversion

Illumina recommends the following kits for bisulfite conversion. They do not recommend using any other kits.

- * EZ DNA Methylation Kit for 50 DNA reactions (Zymo Research, catalog # D5001)
- * EZ DNA Methylation Kit for 200 DNA reactions (Zymo Research, catalog # D5002)
- * EZ-96 DNA Methylation Kit for 2x96 DNA conversion reactions (deep-well Zymo-Spin I-96 Filter Plate) (Zymo Research, catalog # D5004)

Any type of bisulfite conversion kit may be used for the Pyromark system.

A bisulfite conversion service is available through the Fragment Analysis Facility or investigators should do their own conversion. For more information, see page 28 or contact Laura Kasch (410-614-3830) or lkasch@jhmi.edu.

Sequencing

High Throughput Sequencing

At the GRCF HTS Center, our goal is to provide the research community at Johns Hopkins University with access to high throughput sequencing platforms. We currently feature three Illumina HiSeq2000, which have the capability to generate sequences with high accuracy at an extremely low cost per base. Using a sequencing-by-synthesis chemistry, billions of bases are produced with each run at a cost of less than 1% of capillary based methods.

We currently support:

- * Sequencing of indexed libraries, which allows multiplexing of multiple samples per lane, at no extra charge
- * Genomic, RNAseq, ChIPseq, methylation, de novo, and DGE sequencing
- * Free consultation and analysis

Whole Exome/Targeted Sequencing

We offer end-to-end service for targeted resequencing using Agilent's SureSelect All Exon Kit or custom targeted kits ranging from 500kb to 6.8Mb and greater. Our service includes:

Library Prep

- **Capture**
- **Sequencing to a minimum completeness level of 90% coverage at 8x or greater**
- **Complete analysis:**
 - **QC metrics, mapping statistics, hybridization and selection metrics**
 - **Sensitivity and specificity report using Veracode 96 genotyping data**
 - **Annotated variant list for snps and indels, including dbsnp, RefSeq, OMIM, SIFT score, 1000 genomes MAF, and more.**

Whole Genome Sequencing

The GRCF High Throughput Sequencing Center has teamed up with both Complete Genomics Inc. (CGI) and the Illumina Genome Network (IGN) to offer complete **human** genome sequencing to the Johns Hopkins University at a significantly reduced cost.

Please visit http://grcf.jhmi.edu/hts/whole_genome.html for more information and pricing.

Pricing

Visit <http://grcf.jhmi.edu/hts> for pricing information.

Ordering

To place an order, please go to <http://grcf.jhmi.edu/hts/ordering.html>

Turnaround time is dependent upon the number of samples, the type of application, and instrument availability. Due to the rapid advancement of new sequencing technologies, information is subject to change.

Please contact David Mohr at dwmohr@jhmi.edu or 410-550-0371 for more information

Pyrosequencing

Pyrosequencing is a method of sequencing that relies on light emitted in an enzymatic reaction set in motion by the release of pyrophosphate when a base is added during the sequencing process. The results are quantitative, making the method ideal for sequencing samples of known sequence that may have mutations in proportions as low as 5%, such as tumor samples or mixed viral populations. Test kits exist for APOE, BRAF, KRAS, HFE and MTHFR, but any small region (around 80 bases) can be analyzed with custom primers. Assay design and analysis software is available for use by any Johns Hopkins investigator.

This method can be used for characterization of contiguous and multivariable mutations, LOH analysis, unambiguous, fully quantitative genotyping that distinguishes multi-site variations from single nucleotide polymorphisms.

Microbial identification and drug resistance typing is another potential use of this method. It provides rapid and reliable high-throughput screening. Mutations can be accurately identified without use of expensive labels and dyes.

Product	Price per sample
Pyrosequencing	\$6.50 - \$5.00, dependent number of samples

Sanger Sequencing

DNA sequencing services are currently provided using the Applied Biosystems 3730xl DNA Analyzer. The ABI machines utilize a one-capillary cycle sequencing process with refined, four-dye fluorescent labeling methods and a real-time scanning detector. The biochemistry of one-lane sequencing is similar to Sanger-based methods.

The service provides standard sequencing primers for several vectors. For a list of standard primers visit: <http://daf.jhmi.edu/links/seqprimer.html>. Custom primers are provided by the user or can be synthesized in our facility.

Service	Price
Individual samples	\$7.00
95 samples in a 96 well plate	\$6.50
BAC protocol reactions (used on BACs, other large templates or very GC rich templates)	\$25.00
Same day service per sample (minimum of 5 samples)	\$20.00

Sample Drop Off

Sample drop off: Standard daily schedules require samples to be dropped off in Blalock by 1 PM or 3 PM. 1 PM samples will be ready by 10 AM the following day, 3 PM samples will be available the following afternoon. Same day sequencing service is available at a higher fee per sample, with a minimum of 5 samples. Samples must be ordered on the JHU Finch server and physically present in our facility by 9 AM and data will be released around 5 PM.

Remote drop off is available at the Bayview campus and other locations. For details on specific sites and drop off times, see: <http://www.daf.jhmi.edu/location.html>.

Ordering

All Sequencing orders are placed using the JHU Ordering Server, <https://jhu.genesifter.net/>. This data management server has a wealth of features, including e-commerce style ordering, the ability to edit your own requests, storage of sequence information on the system, and email notification of order status. Also, the JHU Ordering Server enables us to store your data indefinitely while providing immediate access from anywhere in the world. New users can create their own logins on the ordering site. If you need assistance, please call 410-955-2836

Special Services

Bisulfite Conversion

Bisulfite conversion of isolated DNA is offered using Zymo Research Corporation's EZ DNA Methylation Kit. Converted DNA is suitable for PCR, endonuclease digestion, sequencing, microarrays, Pyrosequencing and Illumina's Infinium and Golden Gate Methylation Assays. Samples must be submitted in 96-well plates.

For more information, go to <http://faf.grcf.jhmi.edu>.

Self Service Real Time PCR Equipment

The DNA Analysis Facility offers self-service access to two Applied Biosystems Taqman 7900HT Real Time PCR Machines by appointment. The machines can accommodate 96 and 384 well plates, as well as Taqman Low Density Array (TLDA) microfluidic cards. They may be used for SNP genotyping, gene expression, CNV, and microRNA assays. Investigators may reserve the machine in blocks of three hours (full length runs) or 15 minutes (end point only reads). All reactions should be set up by the investigator in their own lab, and the plate brought at the appropriate step in the process for loading on the machine. The specialized centrifuge and staking equipment necessary for loading the microfluidic cards is available for use in our lab. At the completion of the run, investigators may return and retrieve their data via CD or flash drive.

Times are scheduled on a first come, first served basis by calling 410-955-2836 or by stopping in Blalock 1004. Available time blocks are: 7 AM - 10 AM, 10 AM - 1 PM, 1 PM - 4 PM and 4 PM - overnight. Please provide PI name, your phone number, internal order number and required block type at time of ordering. For more information on accessing equipment, please see <http://daf.jhmi.edu/taqman.html>.

<i>Equipment Time</i>	<i>Price</i>
3 hour block	\$30.00
15 minute block	\$10.00

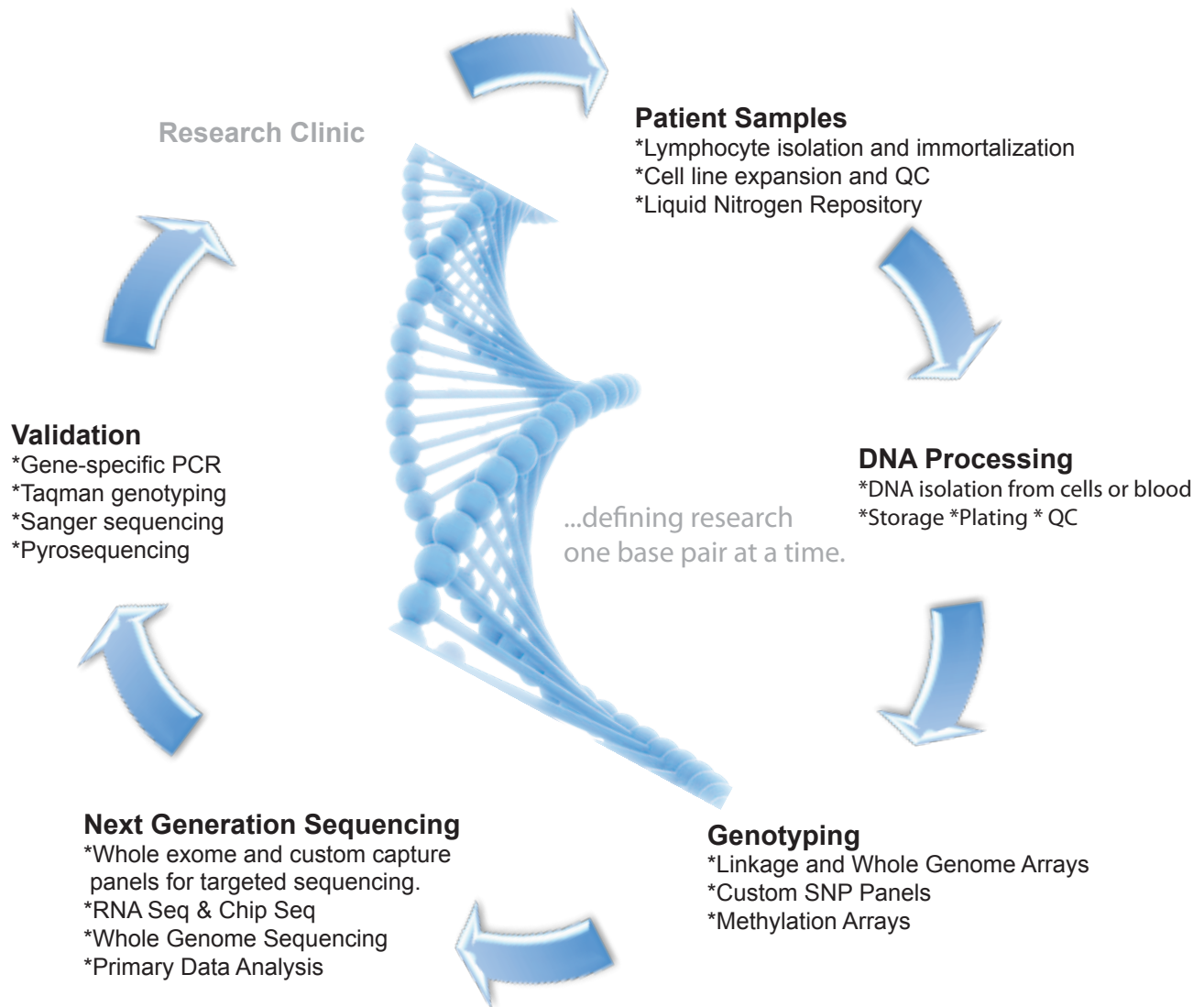
Whole Genome Amplification

Whole genome amplification of extracted DNA is carried out using a REPLI-g kit (QIAGEN). The kit uses Multiple Displacement Amplification technology to produce highly uniform amplification across the genome. The genome is isothermally amplified utilizing a DNA polymerase with 3' → 5' exonuclease proofreading activity capable of replicating up to 100 KB without disassociating from the DNA template. Typical yields from the REPLI-g kit are 40ug DNA with a product range of 2 to 100 KB and an average of greater than 10 KB. Poor quality genomic DNA may result in synthesis failure due to an inhibitor in sample, reduced call rates, or loss of loci or alleles in the amplification product.

<i>Number of Samples</i>	<i>Price/Sample</i>
7 minimum	\$100.00
8 - 21	\$50.00
22 - 42	\$40.00
43 - 84	\$25.00

For additional information, instructions for submission and request forms please go to <http://faf.grcf.jhmi.edu/index.html>

The Genetic Resources Core Facility



For more information please visit <http://grcf.jhmi.edu>