

Exhibit A: University of Michigan DNA Sequencing Core Services, Pricing and Information for External Clients

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The University of Michigan DNA Sequencing Core (“UMDSC”) provides analytical services to UMich-affiliated researchers (“internal clients”) and non-UMich-affiliated researchers (“external clients”). This document is an appendix to the BRCF Service Agreement, and lists the services provided to external clients of the UMDSC, including the prices of those services as of the above revision date. Please refer to the following URL to obtain the latest revision of this document:

http://seqcore.brcf.med.umich.edu/sites/default/files/DNASC_ExhA.pdf

Revisions to the UM DNA Sequencing Core’s Exhibit A (henceforth referred to as simply “Exhibit A”) will be made periodically at our discretion, and may include price changes or changes in service. Such revisions become effective when the revised Exhibit A becomes available on the above URL, and at that time it supersedes all previous versions of Exhibit A. No further notification will be given to preexisting external clients, beyond replacement of the Exhibit A at the above URL. It is the responsibility of the external client to check for the latest Exhibit A when preparing to request services from the UMDSC. A Service Agreement, signed in association with one Exhibit A, will remain in effect and unrevised in event a revised Exhibit A goes into effect.

The University of Michigan DNA Sequencing Core offers nucleic acid analysis services as listed in the following table. For definitions or for detailed information on the services, please consult with staff members of the UMDSC, or refer to the UMDSC’s web site (<http://seqcore.brcf.med.umich.edu>).

Sanger Sequencing:

Sanger DNA Sequencing, regular service:	\$3.87/lane
Sanger DNA sequencing, full 96-well plates:	\$3.23/lane
Sanger DNA sequencing, “Reduced Service” full 96-well plates (avail. at our discretion):	\$3.10/lane
Sanger DNA sequencing, “siRNA Construct”:	\$7.74/lane
Sanger DNA Sequencing, “Large DNA”:	\$7.74/lane
Sanger DNA sequencing, bulk submissions (very large projects):	contact us.

Fragment Analysis:

Fragment Analysis, purchase one “CE Loading Plate”:	\$33.54/plate
Fragment Analysis, Capillary electrophoresis on one 96-well plate:	\$69.66/plate
Fragment Analysis, “Identifiler Plus” (CODIS microsat markers):	\$41.28/sample

Taqman analysis:

Taqman, run one ready-to-load 96-well plate in real time:	\$23.22/plate
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Sequenom services:

Sequenom MassARRAY, one “Pinset” of reactions (24):	\$245.10/pinset
Sequenom MassARRAY, one “Quadrant” of reactions (96):	\$593.40/quadrant
Sequenom MassARRAY, one “Half Chip” of reactions (192):	\$967.50/half chip
Sequenom MassARRAY, one “Full Chip” of reactions (384):	\$1728.60/full chip
Sequenom EpiTyper service, added cost per chip:	\$812.70/full chip
Sequenom technician time (assay design, extra data analysis):	\$98.04/hour

PyroMark Pyrosequencing services:

One full plate pyrosequencing, materials and standard labor:	\$412.80/run
Partial plate – 24 wells, materials and standard labor time:	\$283.80/run
Extra effort, hourly technician time beyond standard labor:	\$74.82/hr

Illumina Microarray services:

Illumina Microarray services: Microarray expendables at market price.	
Illumina Microarray technician time:	\$60.63/hour
Reagents for processing one 96-well plate:	\$296.70/plate
Scan time – instrument use per hour:	\$12.13/hour

Illumina Sequencing services, Libraries:

Standard genomic/metagenomic library:	\$87.72/library
Ultra-low input genomic/metagenomic library:	\$136.74/library
Non-stranded RNA-seq library:	\$149.64/library
Stranded RNA-seq library, polyA-selected:	\$175.44/library
Stranded RNA-seq library, RiboZero rRNA depleted:	\$250.26/library
NEB Ultra non-stranded RNA-seq library (rRNA depletion reagents client-supplied):	\$159.96/library
NEB Ultra stranded RNA-seq library (rRNA depletion reagents client-supplied):	\$159.96/library
SMARTer stranded RNA-seq library (rRNA depletion reagents client-supplied):	\$251.55/library
smRNA-seq library:	\$180.60/library
PCR-free genomic library:	\$95.46/library
Exome Capture, pools:	\$670.80/capture
Multiplexing costs:	\$23.22/sample
Size selections:	\$23.22/sample
Illumina Library Technician time, special services:	\$95.46/hour

Illumina Sequencing Services, Sequencing lanes:

V4 Single-end sequencing, 50 nt read length:	\$1135.20/lane
V4 Single-end sequencing, 125 nt read length:	\$1496.40/lane
V4 Single-end sequencing, 150 nt read length:	\$1844.70/lane
V2 Single-end sequencing, 50 nt read length, RAPID:	\$1199.70/lane
V2 Single-end sequencing, 100 nt read length, RAPID:	\$1509.30/lane
V2 Single-end sequencing, 200 nt read length, RAPID:	\$2025.30/lane
V4 Paired-end sequencing, 50 nt read length:	\$1793.10/lane
V4 Paired-end sequencing, 125 nt read length:	\$2605.80/lane
V4 Paired-end sequencing, 150 nt read length:	\$2954.10/lane
V2 Paired-end sequencing, 50 nt read length, RAPID:	\$1806.00/lane
V2 Paired-end sequencing, 100 nt read length, RAPID:	\$2309.10/lane
V2vPaired-end sequencing, 150 nt read length RAPID:	\$2967.00/lane
H4K Single-end sequencing, 50 nt read length:	\$1083.60/lane
H4K Paired-end sequencing, 50 nt read length:	\$1806.00/lane
H4K Paired-end sequencing, 75 nt read length:	\$1922.10/lane
H4K Paired-end sequencing, 150 nt read length:	\$2605.80/lane
MiSeq 50 cycle sequencing:	\$1522.20/lane
MiSeq 150 cycle sequencing:	\$1625.40/lane
MiSeq 300 cycle sequencing:	\$1793.10/lane
MiSeq 500 cycle sequencing:	\$1935.00/lane
MiSeq 600 cycle sequencing:	\$2399.40/lane
Duo cBot RAPID kit:	\$250.26/kit
1 TB drive (data return option):	\$92.88/drive
Technician time, extra effort:	\$180.60/hour

Pacific Biosciences Sequencing services:

PacBio shearing/QC:	\$114.81/sample
DNA library preparation, MagBead library:	\$603.72/sample
<i>Additional reagents may be required, in certain cases. Discuss with Core staff.</i>	
BluePippin Isolation:	\$143.19/sample
PacBio SMRT Cell sequencing, MagBead loading:	\$548.25/SMRT cell

Ion Torrent/Ion Proton Sequencing services:

Ion sample shearing/QC:	\$72.24/sample
Ion Library, Genomic:	\$516/sample
Ion Library Exome selection:	\$1,238.40/sample
Ion Library Custom Capture:	\$774/sample
<i>Additional reagents may be required, in certain cases. Discuss with Core staff.</i>	
Ion Library special services, additional technician time:	\$100.62/hour
Ion Torrent sequencing, 100 nt reads:	\$812.70/run
Ion Torrent sequencing, 200 nt reads:	\$877.20/run
Ion Proton sequencing, P1 cell:	\$2244.60/run
Ion P1 RUN ONLY (user-supplied reagents)	\$1,161.00/run

Affymetrix Services:

(Note: Except as noted below, all Affymetrix microarrays are provided by customer; prices are for processing costs ONLY)

Standard GeneChip expression profiling, whole-transcriptome:	\$331.53/sample
Standard GeneAtlas expression profiling, whole-transcriptome:	\$296.70/sample
Standard GeneTitan expression profiling, whole-transcriptome:	\$201.24/sample
Standard GeneChip expression profiling, 3':	\$331.53/sample
Standard GeneAtlas expression profiling, 3':	\$296.70/sample
Standard GeneTitan expression profiling, 3':	\$201.24/sample
Standard GeneChip expression profiling, NuGen whole-transcriptome:	\$286.38/sample
Standard GeneAtlas expression profiling, NuGen whole-transcriptome:	\$265.74/sample
Standard GeneTitan expression profiling, NuGen whole-transcriptome:	\$214.14/sample
Partial service, GeneChip expression profiling:	\$104.49/sample
Partial service, GeneAtlas expression profiling:	\$39.23/sample
Partial service, GeneTitan expression profiling:	\$53.83/sample
GeneChip SNP typing:	\$374.10/sample
GeneChip SNP typing, hybridization only:	\$55.47/sample
Axiom (GeneTitan/GeneAtlas) SNP typing:	\$34.83/sample
OncoScan SNP typing: <i>includes chips</i>	\$986.85/sample

qPCR Arrays:

(Note: All qPCR arrays are provided by customer; prices are for processing costs ONLY)

Qiagen Superarray sample processing (labor only), 96- or 384-well plates:	\$314.76/plate
<i>Materials are charged at market prices.</i>	
Life Technologies OpenArray sample processing (labor only):	\$165.12/run
<i>Materials are charged at market prices.</i>	
Life Technologies OpenArray microRNA sample processing (labor only):	\$193.50/run
<i>Materials are charged at market prices.</i>	

DNA Purification Services:

Whole blood DNA isolation:	\$52.25/sample
Whole blood-finish only:	\$36.77/sample
Compromised blood DNA isolation:	\$63.21/sample
Compromised blood-finish only:	\$42.57/sample
Saliva DNA isolation:	\$25.16/sample
Subaliquotting, transfer or dilution of one sample (DNA, RNA):	\$2.19/sample
Nanodrop or Qubit measurement on one sample:	\$2.19/sample

Sample Quality Control/manipulation:

Agilent Bioanalyzer DNA 1000, full LabChip:	\$90.30/chip
Agilent Bioanalyzer, DNA High Sensitivity, full chip:	\$118.68/chip
Agilent Bioanalyzer RNA 6000 Nano, full chip:	\$87.72/chip
Agilent Bioanalyzer, RNA 6000 Pico, full chip:	\$92.88/chip
Agilent Tape Station DNA 1K analysis:	\$23.87/sample
Agilent Tape Station High-sensitivity DNA 1K analysis:	\$26.32/sample
Agilent Tape Station Genomic DNA:	\$26.32/sample
Agilent Tape Station RNA 6K analysis:	\$23.99/sample
Agilent Tape Station High sensitivity RNA 6K analysis:	\$24.51/sample

Please note the following:

The UM DNA Sequencing Core will process samples on a first-come, first-served basis, but samples from external clients will be processed at lower priority than internal clients. For the Pacific Biosciences sequencer, HHMI Investigators have priority equal to that of UM researchers. Prospective customers must register with the UM DNA Sequencing Core via our computer system (see the "PI Administration" section of Core's web site, URL listed above). All samples must be entered into our computer system, and must be properly labeled with our tracking number(s) *before* they are delivered to this Core. We reserve the right to discard any samples that are not properly labeled. The Core does not return unused samples or portions of samples after completion of work; they are discarded.

Prices listed in this document are those charged to external clients, as determined by the method of billing employed by the University of Michigan Financial Operations. If a client pays using funds from a "shortcode" within the UM Financial

Operations, that client will be charged the rate for internal clients, and the prices listed in this document are not applicable. If a client pays by any other method, then the prices listed in this document are applicable. No exception to this policy will be made for any actual or perceived affiliation the client may have with the University of Michigan, nor for any collaborative agreement the client may have with a University of Michigan employee, faculty, student, officer or agent.

An analysis performed by the UMDSC can fail for many reasons, including failures on the Core's part (e.g. instrument malfunction, Core technician error) and failures on the Customer's part (e.g. misquantitated nucleic acids, misdesigned experiment, impure samples). We will, to the best of our ability, assess whether a failed analysis is due to a failure on the part of the Core, and we reserve the right to decide whether to repeat an analysis or to refuse to perform such a repeat, based on our assessment. We will not be held liable for analytical failures arising due to errors or problems in the Client's laboratory. We will not bear the cost of repeat runs unless we initiated the repeat of our own accord, or they prove that the Core was at fault in the original failure. Determination of the cause of failure is based solely on our judgment.