

6/24/2014

**J.E. Invoice:**

1. Exome sequencing: This is \$1000 each. Right now I only have JE's saliva sample for sequencing. If he wants to submit the kits I provided him with, it will be \$1000 for each additional sample.  
= \$1000 (+ \$1000 for every additional exome for other people submitting saliva samples)
2. Exome sequencing of JE's fibroblasts: I discussed with JE the research significance of comparing his exome data on blood with his fibroblast cell lines (which I already have frozen down in liquid nitro at Boston Childrens Hospital). Sequencing this cell line would be an additional \$1000.

I'm going to try my best to get it in with this sequencing run but because they are cells, that may be tricky. (They'll get in the next round if they don't make this one.)

= \$1000

3. iPS cell lines: We've discussed making adult stem cells from JE's fibroblast cells. If we do this, he, like George Church, would be one of very few people in the world to have this done. With multiple cell passages, the process takes a minimum of 6 months and there's no guarantee it will work – but the failure rate is probably around 1 in 6 or less and even in those instances, we can still do it – it would just take more time and some additional funds for reagents.

Price = \$10,000. This is pretty much at cost given the labor and reagents. I only know of 1 commercial group providing this service – and they charge more than \$10,000/ induced pluripotent cell line.

= \$10,000

4. Whole genome sequencing through Illumina: I won't be able to send this on to Illumina until JE completes the second consent form which should be available in 1-2 weeks. If he wants to send it ahead of time though, I guess that's fine.

= ~\$11,400 for rapid turnaround

I don't know if JE's parents are living – but if he wanted to include them (which greatly aids my genome analysis to have that data to compare), the cost would be \$21,000. See:

[http://www.illumina.com/clinical/illumina\\_clinical\\_laboratory/igs\\_for\\_doctors/how\\_to\\_order.ilmn](http://www.illumina.com/clinical/illumina_clinical_laboratory/igs_for_doctors/how_to_order.ilmn)

5. Whole genome analyses: We only discussed very briefly so I'm not sure Jeffrey will remember but I mentioned to him that I was starting a medical genomics private practice that would charge for personal whole genome and exome analyses. We're planning to price this in the \$10,000 range per patient and will include reanalysis of genomic data (based on our collective improved knowledge of genomic variants) on a yearly basis for 3 years.

My plan for the first few people to sign up is to offer longterm biobanking of DNA and cells and *lifelong* reanalysis of data. Even if we expand as planned, because of the labor involved, we would only be able to offer this for our first few patients. Essentially, I would be the personal medical genomicist for these people. To my knowledge, no such service is available yet. If he's interested...

= \$10,000

6. Personalized longevity studies: Funding for genetics research in academia generally relies on federal NIH funding or pharma funding – which, respectively, are disease and drug focused. I'm seeking funding to systematically introduce mutations in cell culture that would be expected to increase longevity. If he goes with number 5 (lifelong analyses) and number 3 above (generation of iPS cell lines from his fibros), I would bundle this work into #5 and do the genomic engineering on his iPS cells when they're available.

I would use a CRISPR/Cas9 platform to introduce the mutations. I would need the money for reagents but this work would essentially be included with #5 for JE since he would be one of the first. Since it's so labor intensive (the technology is brand new so there are no automated systems to do this yet).

= free if going with #5 + CRISPR/Cas9 reagents(this should only be a few thousand)

7. Venus project: Jeffrey and I briefly discussed a genomic research studying I'm dubbing the Venus project (he'll know what this). I can do this for him but doing this work would be greatly aided by having some good bioinformatic infrastructure. This infrastructure could be used for the Venus project, YPO analyses, and other projects. Total anticipated costs for this would be \$160,000:

Genomic hardware: \$100,000

Genomic software: \$60,000/yr (this is for 2 systems costing \$30,000 each/yr)

The software component would only need to be paid for 1 year because I'm confident I can get other funding to cover this once we publish data in the first year using these resources.

= \$160,000

This is a big ticket item (at least relative to my bank acct ☺) so I'm happy to discuss this item more with Jeffrey if he's interested in supporting this. If he covers this and pays for

the exomes which \$1000/person – and he mentioned 200 participants being in this project – I can deliver on this “Venus” research.

So, if he goes with everything on this invoice, it's:

1. \$1000 (\$1000 for every additional exome on others he wants to include in the YPO study)
2. \$1000 for exome sequencing of JE's fibros
3. \$10,000 to create adult stem cells for JE from his fibro cell lines
4. \$11,400 for his whole genome (\$21,000 if he wanted to include both of his parents; not sure if this is even feasible)
5. \$10,000 indefinite biobanking of his samples for eternity, lifelong reanalysis of genomic data on an annual basis, and CRISPR/Cas9 manipulation of his adult stem cells to introduce mutations in culture believed to increase longevity. I'm only offering this to Jeffrey. Because of all the labor involved, there's simply not enough bandwidth to offer this to more than a handful of people right now (at least in 2014).
6. Included in #5
7. \$160,000 Bioinformatic infrastructure for the Venus project, the YPO study, and any other pet genomic projects Jeffrey might have interest in now or in the future.

Total: \$193,400.00