BEFORE THE
SCIENCE SUBCOMMITTEE OF THE
INDEPENDENT CITIZENS' OVERSIGHT COMMITTEE
TO THE
CALIFORNIA INSTITUTE FOR REGENERATIVE MEDICINE
ORGANIZED PURSUANT TO THE
CALIFORNIA STEM CELL RESEARCH AND CURES ACT

REGULAR MEETING

LOCATION: AS INDICATED ON THE AGENDA

DATE: WEDNESDAY, JANUARY 11, 2012
10 A.M.

REPORTER: BETH C. DRAIN, CSR
CSR. NO. 7152

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WEDNESDAY, JANUARY 11, 2012

10 A.M.

CHAIRMAN SHEEHY: I THINK WE'LL GO AHEAD AND OPEN THE MEETING AND CALL THE ROLL, AND THEN PERHAPS WE CAN GO AHEAD WITH -- THE ONLY ITEM WE HAVE ON OUR AGENDA TODAY IS CONSIDERATION OF THE GENOMICS INITIATIVE. WE CAN GO AHEAD AND GET STARTED, LET STAFF PRESENT THAT, AND THEN HAVE A DISCUSSION. DOES THAT SOUND ACCEPTABLE?

I'M GOING TO CALL THE MEETING TO ORDER NOW, AND, MARIA, WOULD YOU CALL THE ROLL?

MS. BONNEVILLE: SUE BRYANT.

DR. BRYANT: HERE.

MS. BONNEVILLE: MARCY FEIT. MICHAEL FRIEDMAN.

DR. FRIEDMAN: HERE.

MS. BONNEVILLE: BERT LUBIN.

DR. LUBIN: HERE.

MS. BONNEVILLE: SHLOMO MELMED.

DR. MELMED: HERE.

MS. BONNEVILLE: PHIL PIZZO.

DR. PIZZO: HERE.

MS. BONNEVILLE: DUANE ROTH. JOAN SAMUELSON.

MS. SAMUELSON: HERE.
MS. BONNEVILLE: JEFF SHEEHY.
CHAIRMAN SHEEHY: HERE.
MS. BONNEVILLE: JON SHESTACK.
MR. SHESTACK: HERE AS AUDITOR.
MS. BONNEVILLE: OS STEWARD.
DR. STEWARD: HERE.
MS. BONNEVILLE: ART TORRES. JONATHAN THOMAS.
CHAIRMAN THOMAS: HERE.
MS. BONNEVILLE: KRISTINA VUORI.
CHAIRMAN SHEEHY: DO WE HAVE A QUORUM?
MS. BONNEVILLE: WE DO HAVE A QUORUM.
CHAIRMAN SHEEHY: OKAY. DR. TROUNSON, FROM YOUR TEAM?
DR. TROUNSON: THANK YOU VERY MUCH.
MS. BONNEVILLE: ACTUALLY WE DON'T. WE'RE WAITING FOR MARCY.
DR. TROUNSON: THANK YOU VERY MUCH. AS A LITTLE BACKGROUND TO THIS, SOME 12 TO 18 MONTHS AGO WE STARTED TALKING WITH PEOPLE ABOUT WHETHER THERE WAS A NEED TO REALLY PROVIDE MUCH DEEPER CAPACITY IN GENOMICS TO STEM CELLS BECAUSE YOU WILL BE AWARE THAT THERE ARE A LOT OF GENOMICS ISSUES WITH STEM CELLS INCLUDING EPIGENETICS. AND IT'S REALLY ABOUT

STEM CELLS AND THEIR STABILITY, THEIR ABILITY TO REALLY MAINTAIN THEIR CHROMOSOMAL INTEGRITY, THEIR GENOMIC INTEGRITY; THAT IS, THEY'RE NOT MISSING PARTS OF THEIR DNA PARTICULARLY AROUND GENES WHICH WOULD BE OF CONCERN SUCH AS TUMOR SUPPRESSORS, AND ALSO THE WHOLE DIFFERENTIATION PROCESS INVOLVES EPIGENETIC CHANGES WHICH ENABLE THEMSELVES TO PERFORM A DIFFERENT FUNCTION AS THEY DIFFERENTIATE. SO THAT'S GOVERNED REALLY BY THE EPIGENOME WHICH REGULATES THE WAY GENES ARE EXPRESSED.

THE AREA OF GENOMICS HAS PROGRESSED VERY, VERY RAPIDLY. AND I THINK YESTERDAY THERE WAS A PAPER ON THE DEEP SEQUENCING OF THE WHOLE GENOME COMING DOWN TO BELOW $1,000. IF YOU REMEMBER THE COSTS THAT WERE INVOLVED IN ANALYSIS OF THE FIRST HUMAN GENOMES, THAT WAS OVER A MILLION DOLLARS TO DO ONE GENOME AT THAT TIME. SO THERE'S BEEN A SUBSTANTIAL CHANGE.

THERE'S ALSO VERY INTERESTING INFORMATION ABOUT THE HUMAN GENOME WHICH IS NOW PERCOLATING OUT REALLY WIDELY INTO THE SCIENTIFIC COMMUNITY AND IN HEALTH AND IN THE COMMUNITY IN GENERAL. THIS IS THE WAY THEY'RE STARTING TO FRAME NEW ORGANISMS USING ARTIFICIAL DNA. THEY'RE DOING INCREDIBLE THINGS WHICH ARE REALLY BASED ON THEIR ABILITY TO

UNDERSTAND THE GENOME.

SO FROM THE POINT OF VIEW OF STEM CELLS, IT WAS A TIME TO REALLY ACCELERATE OUR CAPACITY IN GENOMICS AND TO REALLY GIVE CALIFORNIA THE LIFT OF REALLY GOING UP TO THE LEVEL OF WHERE THE HUMAN GENOME RESEARCH IS, AND WOULD THAT REALLY PROVIDE SOME ADDED CAPACITY TO WHAT WE'RE DOING AND ALSO LIFT CALIFORNIA INTO THAT NEW PHASE, IF YOU LIKE, OF BEING ABLE TO BE COMPETITIVE IN STEM CELLS SCIENTIFICALLY, BUT ALSO PROBABLY IN DUE COURSE CLINICALLY.

SO THE DISCUSSIONS WERE, WELL, DO WE HAVE REALLY HIGH-POWERED GENOMICS IN CALIFORNIA? AND, YES, WE DO. WE HAVE GOOD GENOMICS IN THE INSTITUTIONS, AND IT IS REALLY THE INSTITUTIONS THAT ARE DOING MOST OF THE GENOMICS, CURRENTLY DOING MOST OF THE GENOMICS WORK, BUT THERE'S ANOTHER LEVEL THAT IS BEYOND THERE WHERE HARDWARE IS TURNING OVER PROBABLY ON A 12-MONTH BASIS INTO THE NEW TYPES OF HARDWARE, SOFTWARE AND IS BEING REPLACED VERY RAPIDLY. AND THERE'S A MASSIVE AMOUNT OF DATA CAPABILITY NOW THAT'S BEEN INVESTED IN PLACES LIKE CALIFORNIA THROUGH THE SUPERCOMPUTERS, FOR EXAMPLE, THAT ARE IN SAN DIEGO WITH REAL CAPACITY FOR LOOKING AT LARGE AMOUNTS OF DATA IN A WAY WHICH IS

EFFECTIVE.

SO THE DISCUSSIONS THAT I ORIGINALLY ASKED MIKE YAFFE AND THE SCIENCE OFFICE TO UNDERTAKE WERE TO EXPLORE THIS AND TO LOOK DEEPLY BOTH IN THE STATE AND EXTERNALLY ABOUT WHAT WAS THE CASE FOR DEVELOPING SOME STEM CELL CENTERS OF EXCELLENCE BASED ON STEM CELLS AND GENOMICS. MICHAEL DID THE INITIAL WORK. AND THEN WHEN I HAD NATALIE DEWITT COME ON AS A SPECIAL PROJECTS OFFICER, I'VE HAD HER INVESTED IN DOING THIS.

AND THE ISSUES THAT WE'VE RAISED ARE IN THE OPINION PIECE. THEY REALLY ARE THE BACKGROUND FOR WHAT THE CASE IS FOR HAVING THESE GENOMICS CENTERS. PLEASE READ THAT, AND I HOPE THE BOARD MEMBERS HAVE ACCESS TO THAT.

SO OUR PROPOSAL IS TO SEEK TO SUPPORT THE DEVELOPMENT OF ONE OR POSSIBLY TWO GENOMICS CENTERS IN CALIFORNIA, STEM CELL AND GENOMICS CENTERS IN CALIFORNIA, WHICH ARE BASED ON LEVERAGING OUR DEVELOPMENT UP THE SCALE TO CREATE A NEW ERA, I THINK, FOR STEM CELLS AND GENOMICS AND TO ENABLE THAT TO BE ACCESSIBLE BY ALL PARTIES IN CALIFORNIA AND WHEREVER ELSE WE HAVE COLLABORATIVE FUNDING PARTNERSHIPS.

SO WITH THAT BACKGROUND, A LOT OF SUPPORT

FROM DIFFERENT BOARD MEMBERS AS WE'VE MOVED ALONG THIS PROCESS, BUT WITH THAT BACKGROUND, MAYBE I SHOULD TURN IT OVER TO MICHAEL TO GIVE A LITTLE MORE ABOUT WHAT WE'RE PROPOSING TO DO IN TERMS OF THE CONCEPT PROPOSAL AND THEN TRY AND ANSWER ANY QUESTIONS THAT COME FORWARD FROM BOARD MEMBERS OR THE PUBLIC.

DR. YAFFE: THERE'S A PRESENTATION HERE WHICH I'M NOT FAMILIAR WITH, SO WE'RE GOING TO WALK THROUGH IT, AND I HOPE -- CAN I CONTROL IT FROM HERE? -- AND AS ALAN HAS SAID, WE ARE IN THE ERA OF GENOMICS WHERE THERE'S REALLY UNPRECEDENTED OPPORTUNITY TO EXPLOIT TECHNIQUES AND KNOWLEDGE AND UNDERSTANDING OF GENOMICS. WHEN WE SAY GENOMICS, WE MEAN NOT ONLY DNA SEQUENCE, BUT ALL THE INFORMATICS INFORMATION, INCLUDING THE EPIGENOMICS, RNA TRANSCRIPTOME, AND OTHER ASPECTS OF INFORMATION CODING IN CELLS, AND TO USE THAT INFORMATION TO INFORM BASIC STEM CELL BIOLOGY AND TRANSLATION OF STEM CELL RESEARCH INTO THE CLINIC, PROVIDING, FOR EXAMPLE, NEW INSIGHTS INTO CAUSES OF DISEASES, IMPROVED DIAGNOSTICS AND BIOMARKERS, AND NEW AND MORE PERSONALIZED THERAPEUTICS.

WE'RE SEEING ALREADY EXAMPLES IN PERSONALIZED MEDICINE, IN DRUG DESIGN PARTICULARLY

IN THE CANCER FIELD, OF THE USE OF VERY POWERFUL GENOMIC APPROACHES TO GET AT TAILORING DRUGS AND TREATMENTS, ANALYSIS, AND DIAGNOSIS TO A VERY PERSONALIZED AND CRITICAL LEVEL THAT CAN BE USED TO MORE EFFECTIVELY ADDRESS DISEASE AND INJURY.

SO AS ALAN HAS INDICATED AND MANY OF YOU ARE AWARE, THE PRICE OF SEQUENCING, WHICH IS AT THE HEART, BUT CERTAINLY NOT THE ONLY ACTIVITY IN GENOMICS, BUT AT THE HEART OF GENOMICS, THE DNA SEQUENCING IS DROPPING PRECIPITOUSLY AND RAPIDLY, AND TO THE POINT THAT ACTUALLY IN OUR DOCUMENT WE TALKED ABOUT, THAT IS IN THE PUBLICATION, THAT WE'LL PROBABLY SEE THE THOUSAND-DOLLAR GENOME WITHIN A COUPLE OF YEARS. AND IT TURNS OUT WE'RE SEEING IT YESTERDAY. AND I'M SURE COMMERCIALLY THIS WILL BE AVAILABLE IN A MATTER OF WEEKS TO MONTHS.

THE CONSEQUENCE OF THIS RAPID DROP IN THE PRICE OF DNA SEQUENCING IS THAT IT MAKES PRACTICAL USE OF WHOLE GENOME SEQUENCING, THE ANALYSIS OF EVERY SINGLE NUCLEOTIDE IN THE DNA, IN A POPULATION OF STEM CELLS OR EVEN IN INDIVIDUAL STEM CELLS, A PRACTICAL APPROACH TO EXPLORE STEM CELL BIOLOGY AND TO USE THIS TO MOVE ON TOWARDS TRANSLATION AND DEVELOPMENT OF THERAPEUTICS.

HERE I THINK WE HAVE SOME EXAMPLES OF HOW

GENOMICS DATA GENERATED BY STEM CELL RESEARCH, TYPES OF GENOMICS DATA, AND HOW THIS MAY THEN INFORM THERAPEUTIC ADVANCES. SO REPRESENTED ON THIS SLIDE ARE THE TYPES OF INFORMATION ONE COULD OBTAIN THROUGH GENOMIC ANALYSES, DNA MODIFICATION, INFORMATION ABOUT GENOMIC INSTABILITY OR STABILITY OF STEM CELLS, INFORMATION ABOUT THE GENETIC BASIS AND CHARACTERISTICS OF THERAPEUTIC CELL LINES, OF COURSE, ABOUT IPSC-BASED DISEASE MODELS, WHICH THE BOARD AT THE LAST MEETING APPROVED A CONCEPT PROPOSAL FOR AN IPSC INITIATIVE AND BANK, AND A HOST OF OTHER ACTIVITIES WHICH CAN BE TRANSLATED TO ADVANCES IN TISSUE ENGINEERING AND CELL MANUFACTURING IN CELL THERAPEUTICS, IN DRUG DISCOVERY, AND TARGET IDENTIFICATION.

SO WHAT WE'RE ASKING THE BOARD TO APPROVE AND ASKING YOU TO CONSIDER, I SHOULD PUT IT IN THE OTHER ORDER, ASKING YOU TO CONSIDER AND HOPEFULLY ASK FOR BOARD APPROVAL OF UP TO TWO AWARDS, ONE OR TWO AWARDS, FOR CENTERS OF EXCELLENCE FOR STEM CELL GENOMICS WITH A COST OF UP TO 20 MILLION PER AWARD, A TOTAL PROGRAM COST OF $40 MILLION WHICH WILL BE SPENT OVER FIVE YEARS.

I'LL TELL YOU IN A BIT ABOUT WHAT THAT MONEY WOULD GO TOWARDS AND HOW IT WOULD BE SPENT.

ELIGIBILITY HERE, WE EXPECT PROGRAMS TO HAVE A PROGRAM DIRECTOR, AND THERE MAY BE SEVERAL CO-PI'S OR CO-DIRECTORS. WE WOULD ENCOURAGE MULTI-INSTITUTIONAL COLLABORATIONS TO FORM THESE CENTERS. THIS COMPETITION WOULD BE OPEN TO BOTH FOR-PROFIT AND NONPROFIT INSTITUTIONS, AND WE WOULD EXPECT SIGNIFICANT COMMITMENT AND EXPENDITURE OF INSTITUTIONAL RESOURCES TO CONTRIBUTE TO THESE CENTERS, PARTICULARLY IN THE FORM OF SPACE FOR THE LOCATION OF THESE CENTERS. THIS INITIATIVE DOESN'T HAVE ANY FACILITIES COMPONENT, SO THE FACILITIES WOULD NEED TO BE SUPPLIED BY THE APPLICANT INSTITUTION.

CENTER ACTIVITIES WOULD BE IN SIX KEY AREAS, AND THESE ARE THE ACTIVITIES THAT WE WOULD EXPECT THE PROPOSALS TO COVER, AND THESE ARE THE ACTIVITIES THAT WOULD BE SUPPORTED BY THESE GRANTS. CONTRIBUTE ADDITIONAL INFORMATION HERE BECAUSE I MAY MISS SOME IMPORTANT FEATURES. BUT THE FIRST OF THESE IS STANDARDIZATION, THE DEVELOPMENT OF STANDARD OPERATING PROCEDURES FOR SAMPLE AND DATA HANDLING WHICH WILL THE FORM THE BASIS FOR LARGE-SCALE DATA SHARING AND ANALYSIS. WE EXPECT, IN FACT, COORDINATION, IF THERE ARE TWO CENTERS, BETWEEN THESE TWO CENTERS TO ADOPT THE SAME

STANDARDS FOR DATA QUALITY, DATA ANALYSIS, AND SAMPLE HANDLING SO THAT THE RESULTS FROM ONE CENTER ARE READILY TRANSFERABLE TO THE OTHER.

SECOND IS COLLABORATIVE RESOURCES. WE WANT THESE CENTERS TO BE RESOURCES FOR RESEARCHERS FROM THROUGHOUT CALIFORNIA, FOR STEM CELL RESEARCHERS TO BE ABLE TO GO TO THE CENTERS, TO INTERACT WITH THE CENTERS, TO CARRY OUT A VARIETY OF RESEARCH PROJECTS FOCUSED ON STEM CELL GENOMICS AND ASPECTS OF GENOMICS APPLIED TO STEM CELL BIOLOGY AND THE TRANSLATION OF STEM CELL BIOLOGY. SO THIS WOULD BE RESEARCH ACTIVITIES WHERE THE CENTERS WOULD SERVE PERHAPS ANALOGOUSLY TO OUR SHARED LABS. THEY WOULD BE THE FIRST CENTERS SUPPLYING EXPERTISE, IN SOME CASES SPECIALIZED TECHNOLOGY, ADVICE, DATA HANDLING AND ANALYSIS, ASSISTANCE TO CATALYZE AND FACILITATE RESEARCH ON A VARIETY OF INDEPENDENT PROJECTS.

THE THIRD AREA IS DATA COORDINATION. THERE IS A HUGE AMOUNT OF EFFORT ON THESE LARGE GENOMIC PROJECTS TO DEAL WITH THE MASSES OF GENETIC AND GENOMIC DATA THAT'S GENERATED, THE SEQUENCING DATA AS IN TERABYTE LEVEL AND LARGER QUANTITITES. AND, IN FACT, IT'S A MAJOR EFFORT TO COORDINATE, HANDLE THIS AMOUNT OF DATA.

FOURTH AREA IS THE DATA ANALYSIS. THIS IS

EXTENSIVE WORK WITH BIOINFORMATICS WITH TAKING ALL THIS INFORMATION AND, IN FACT, TRANSLATING IT INTO USABLE AND INTERPRETABLE RESULTS THAT CAN INFORM PARTICULAR BIOLOGICAL STUDIES.

A FIFTH AREA WILL BE CENTER-INITIATED PROJECTS. WE WOULD EXPECT THESE CENTERS OF EXCELLENCE TO INITIATE ONE OR SEVERAL PROJECTS OF THEIR OWN. THESE WOULD BE DATA-INTENSIVE PROJECTS; FOR EXAMPLE, PERHAPS, ANALYSIS OF CHANGES IN THE DNA, THE ENTIRE GENOME OF CELLS AS THEY GO THROUGH A DIFFERENTIATION PATHWAY. THIS IS THE TYPE OF LARGE-SCALE ANALYSIS THAT THE CENTERS WOULD BE CAPABLE OF BECAUSE OF THEIR RESOURCES, BECAUSE OF THEIR SEQUENCING AND DATA ANALYSIS CAPABILITIES, BUT MIGHT BE VERY DIFFICULT FOR INDIVIDUAL RESEARCHERS WITHOUT ACCESS TO THIS TECHNOLOGY.

AND THE SIXTH AREA WOULD BE TECHNOLOGY DEVELOPMENT. THIS FIELD OF GENOMICS IS UNDERGOING EXTREMELY RAPID PROGRESS, AS WE SEE BY THE RAPID DECREASE IN COST PER GENOME, BUT THERE'S FURTHER NEED FOR TECHNOLOGY DEVELOPMENT TO STREAMLINE, TO FIND CHEAPER, FASTER, AND MORE ACCURATE WAYS TO PROVIDE AND EVOLVE THIS INFORMATION, THE DATA, AND WE EXPECT THE CENTERS TO ACTIVELY PARTICIPATE IN TECHNOLOGY DEVELOPMENT.

OKAY. ON THE NEXT SLIDE WE SEE A PIPELINE THAT SHOWS SOME OF THESE ACTIVITIES TEMPORALLY ALONG A PIPELINE, BUT ALSO SORT OF A DISTRIBUTION OF ACTIVITIES. COLLABORATORS AND CENTERS WOULD BE THE SOURCE OF THE RESEARCH ACTIVITY. THEY WOULD BE THE STARTING POINT FOR THE RESEARCH ACTIVITIES. ALONG THIS PIPELINE THERE ARE SOME KEY ACTIVITIES. ONE IS THE PREPARATION OF SAMPLES WHICH IS CRITICAL. IT'S AN AREA THAT NEEDS STANDARDS, NEEDS PARTICULAR ATTENTION TO MAKE SURE THAT THE DATA THAT'S DERIVED FROM THOSE SAMPLES IS GOING TO BE CONSISTENT AND INTERPRETABLE.

THE NEXT COMPONENT IS NEXT-GENERATION SEQUENCING. NEXT-GENERATION SEQUENCING REALLY IS THE TECHNOLOGY AND THE PROCEDURES FOR THIS RAPID AND INEXPENSIVE DNA SEQUENCING. CALIFORNIA, IN FACT, HAS BEEN THE LEADER IN THE DEVELOPMENT OF THIS TECHNOLOGY. MANY OF THE COMPANIES, THE LEADING COMPANIES IN THE WORLD THAT ARE ADVANCING THIS TECHNOLOGY AND BUILDING THE MACHINES ARE RIGHT HERE IN CALIFORNIA. IT WAS ACTUALLY A BIT SURPRISING WHEN WE STARTED LOOKING INTO THE GENOMICS RESOURCES HERE IN CALIFORNIA FOR RESEARCHERS THAT CALIFORNIA DOESN'T HAVE ANY OF THE MAJOR NATIONAL SEQUENCING CENTERS. THERE ARE THREE HUGE FEDERALLY SUPPORTED

DNA SEQUENCING CENTERS IN THE UNITED STATES, ONE AT THE BROAD IN MASSACHUSETTS, ONE AT WASHINGTON UNIVERSITY, AND ONE AT BAYLOR COLLEGE OF MEDICINE IN TEXAS. AND THEY'RE ALL USING TECHNOLOGY THAT WAS DEVELOPED AND MANUFACTURED HERE IN CALIFORNIA.

SO WE'RE NOT PROPOSING BUILDING A MAJOR CENTER LIKE THAT. THOSE CENTERS ARE SUPPORTED ANNUALLY BY HUNDREDS OF MILLIONS OF DOLLARS CERTAINLY BEYOND OUR RESOURCES HERE. BUT WE ENVISION TWO CENTERS WITH A CONCENTRATION OF CUTTING-EDGE TECHNOLOGY AND A FINE FOCUS ON PROBLEMS RELATED TO STEM CELL BIOLOGY AND STEM CELL THERAPEUTICS.

A FEW OTHER POINTS ALONG THIS PIPELINE, STANDARDIZATION, OF COURSE, OCCURS ALL ALONG THE PIPELINE. DATA COORDINATION I MENTIONED BEFORE IS A KEY BOTTLENECK IN THIS PROCESS. DATA ANALYSIS IS ESSENTIAL, IMPORTANT, AND INVOLVES MUCH BIOINFORMATICS AND TO SOME DEGREE SYSTEMS BIOLOGY. ALL OF THIS CAN YIELD NEW INSIGHTS, BIOMARKERS, DRUGS, NEW CELL LINES, AND NEW INFORMATION ABOUT DISEASE AND ABOUT STEM CELL CHANGES WITH TIME, WITH DIFFERENTIATION, AND WITH MODIFICATION.

A PROVISIONAL TIMETABLE FOR THIS RFA, PROVIDED THIS COMMITTEE AND THE BOARD APPROVES GOING

FORWARD, WOULD BE RELEASE OF THE RFA IN MAY WITH LETTERS OF INTENT DUE IN 2012, APPLICATIONS DUE IN AUGUST -- I'M SORRY. LETTERS OF INTENT DUE IN JUNE, APPLICATIONS DUE IN AUGUST, GRANTS WORKING GROUP REVIEW OF APPLICATIONS IN THE FALL, AND WE WOULD BRING THE RESULTS OF THAT GRANTS WORKING GROUP REVIEW TO THE BOARD IN THE WINTER OF 2013, PROBABLY ABOUT A YEAR FROM NOW.

SO IN CONCLUSION, WE ARE REQUESTING APPROVAL FOR FUNDING OF UP TO TWO CIRM GENOMIC CENTERS OF EXCELLENCE. THE PROGRAM WOULD HAVE A TOTAL PROGRAM COST OF $40 MILLION.

DO MY COLLEAGUES WANT TO ADD ANYTHING THAT I'VE LEFT OUT, AND WE'LL CERTAINLY ENTERTAIN QUESTIONS.

DR. TROUNSON: THANKS VERY MUCH, MICHAEL, FOR STEPPING IN AT THE VERY LAST MOMENT. I THINK YOU'VE DONE WONDERFULLY WELL. IT'S A COMPLEX AREA AND IMPORTANT ONE.

I THINK NATALIE DEWITT HAS MET WITH THE NIH AND OTHER ORGANIZATIONS LOOKING AT THE COST OF THESE ELEMENTS, AND WE HAVE SOME IDEA OF WHAT THESE COSTS ARE. SO THE PROGRAMS HAVE BEEN SET AROUND WHAT YOU MIGHT EXPECT FOR A THREE-YEAR AWARD -- FIVE-YEAR AWARD. IT'S SET AROUND THE EXPECTATIONS

FOR THIS TO BE SORT OF SET IN PLACE AND GIVEN THE ABILITY TO SORT OF DELIVER ON WHAT WE THINK IS AN IMPORTANT NEW DEVELOPMENT IN STEM CELLS.

SO MAYBE THE BEST IDEA, JEFF, WOULD BE TO SORT OF OPEN IT TO QUESTIONS NOW.

CHAIRMAN SHEEHY: SURE. IF YOU'RE READY. SO MAYBE A GOOD WAY TO PROCEED, SINCE MOST EVERYONE IS ON THE PHONE, IF YOU WOULD LIKE TO ENTER THE DISCUSSION, COULD YOU PERHAPS LET ME KNOW AND THEN I'LL CALL YOU.

DR. PIZZO: I'D LIKE TO ENTER WHEN THERE'S TIME.

DR. LUBIN: I'D LIKE TO ENTER WHEN THERE'S TIME.

DR. MELMED: I'D LIKE TO ENTER WHEN THERE'S TIME.

CHAIRMAN SHEEHY: OKAY. DR. PIZZO, BE MY GUEST.

DR. PIZZO: THANKS. FIRST OF ALL, MICHAEL, THANKS FOR A GREAT PRESENTATION, AND I THINK YOU FRAMED THE ISSUES VERY WELL. I HAVE ONE QUESTION AND THEN A COMMENT.

THE QUESTION IS IN GATHERING THE INFORMATION WITH REGARD TO RESOURCE NEEDS, DID THE GROUP ACTUALLY HAVE DISCUSSIONS WITH THE VARIOUS

CENTERS OR UNIVERSITIES IN CALIFORNIA WITH REGARD TO WHAT TECHNOLOGY CURRENTLY EXISTS HERE?

DR. YAFFE: YES, WE DID. FIRST OF ALL, WE SURVEYED ALL THE MAJOR UNIVERSITIES AND RESEARCH INSTITUTES FOR WHAT SEQUENCING AND GENOMICS CAPABILITIES WERE PRESENT. I WOULD ADD THAT WE'D ACTUALLY ANTICIPATE THAT THESE CENTERS WOULD BE BUILT ON TOP OF AND IN CONJUNCTION WITH EXISTING CENTERS SINCE THERE ARE SOME GENOMICS RESOURCES AND STRONG ONES AT A NUMBER OF OUR UNIVERSITIES.

DR. PIZZO: SO YOU ANTICIPATED THE SECOND PART OF MY QUESTION. AND I THINK ONE OF THE THINGS THAT WOULD BE HELPFUL TO UNDERSTAND IS, AND I THINK YOU FRAMED IT WELL, THIS IS NOT JUST ABOUT TECHNOLOGY. IN FACT, THE TECHNOLOGY IS INCREASINGLY BECOMING ALMOST THE EASY PART ALBEIT EXPENSIVE. IT'S REALLY ABOUT HOW TO HANDLE THE DATA, AND YOU ALLUDED TO THAT QUITE CLEARLY.

SO THE QUESTION I HAVE IS AS YOU'RE THINKING ABOUT THE ALLOCATION OF THE GRANTS OR GRANT SUBMISSIONS, IS THERE AN ANTICIPATED PRO FORMA FOR HOW A CENTER MIGHT APPLY FOR THIS? FOR EXAMPLE, IT MAY BE THAT SOME CENTERS NEED LESS TECHNOLOGY AND MORE OF THE INFORMATICS PARTS. IN FACT, IN SOME WAYS ONE WOULD LIKE TO ENCOURAGE THAT BECAUSE THAT'S

GOING TO BE THE ULTIMATE DIFFERENTIATOR FOR A LOT OF THE WORK THAT'S GOING TO GO ON. SO HAVE YOU THOUGHT ABOUT THAT, OR IS THAT GOING TO BE SUBJECT TO -- HOW WILL THAT BE IMPACTED BY THE APPLICANTS?

DR. TROUNSON: WE'RE VERY KEEN TO BE AS COLLABORATIVE AS POSSIBLE, BUILT ON, FOR EXAMPLE, SPACE ON SUPERCOMPUTING AND OTHER MATERIALS AND RESOURCE CAPACITY. AS YOU SAID, THE REALLY IMPORTANT PART IS -- WELL, IT'S ONE OF THE REALLY IMPORTANT PARTS IS THE BIOINFORMATICS, REAL GENUINE, DEEP BIOINFORMATICS CAPACITY. AND THEY TALK ABOUT CLOUD COMPUTING NOW IN ASSOCIATION WITH SORT OF REALLY DEEP BIOINFORMATICS. THERE ARE INSTITUTIONS IN CALIFORNIA WHO ARE OPERATING IN THAT SPACE VERY, I THINK, VERY EFFECTIVELY.

WHAT THEY DON'T HAVE IS REALLY MUCH CONNECTION TO STEM CELLS, AND THAT'S REALLY WHAT WE WERE TRYING TO INTRODUCE.

DR. PIZZO: I GET THAT. AND I THINK ONE OF THE THINGS I'M LOOKING AT, AND, AGAIN, YOU DID TOUCH ON THIS, IS BUILDING THE RIGHT SYNERGIES. THE COMPONENTS ARE GOING TO BE YOU NEED A CERTAIN AMOUNT OF CORE EQUIPMENT. IT DEPENDS ON HOW YOU OPERATE THAT, WHETHER YOU RUN IT 24/7 TO OPTIMIZE THE EFFICIENCY AND THROUGHPUT, AND THEN IT'S WHAT'S THE

RATE-LIMITING STEPS. AND RATHER THAN -- WHAT I WOULD LIKE NOT TO SEE WOULD BE THAT THERE WOULD BE A SEPARATE SET OF CENTERS THAT WOULD BE DEVOTED, IF YOU WILL, JUST TO STEM CELL BIOLOGY BECAUSE MY WORRY ABOUT THAT, AT LEAST THIS IS MY WORRY AND IT'S SUBJECT TO DISCUSSION, OF COURSE, IS THAT THAT COULD BECOME DE MINIMIS AS COMPARED TO TRYING TO SYNERGIZE ONTO WHAT EXISTS, OPTIMIZING SOME OF THE HARDWARE THAT INSTITUTIONS ARE ALREADY PURCHASING BY MAKING SURE THAT THERE'S THE BROAD INFORMATIC SUPPORT THAT WILL REALLY BE THE DIFFERENTIATOR, I THINK, FOR THE FUTURE. SO THAT'S THE WAY I WOULD SEE IT. OTHERS MAY HAVE DIFFERENT POINTS OF VIEW, SO I'LL STOP WITH THAT EXPRESSION.

DR. YAFFE: WE'RE TOTALLY IN LINE WITH THAT THINKING. AMONG THE FEATURES THAT APPLICANTS WILL NEED TO SUPPLY WOULD BE AN ADEQUATE DESCRIPTION OF THE STRATEGY FOR HARMONIZATION AND FOR SYNERGIZING WITH OTHER CENTERS AND WITH OTHER RESOURCES. SO THAT WILL DEFINITELY BE SOMETHING THAT REVIEWERS WILL BE ANALYZING.

DR. PIZZO: VERY GOOD. THANKS.

DR. LUBIN: SO MY QUESTIONS ARE SOMEWHAT SIMILAR TO PHIL'S, BUT SLIGHTLY DIFFERENT. FIRST OF ALL, THIS ISSUE OF COMPARISON TO PERSONALIZED

MEDICINE AND PERSONALIZED STEM CELL THERAPIES I THINK IS OUTSTANDING AND DEFINITELY IS THERE. I THINK SOME OF YOU PROBABLY KNOW AND YOU MAY HAVE FOUND THIS OUT, BUT IN THE BIG PERSONALIZED MEDICINE PROGRAM AT PARTNERS IN MASSACHUSETTS, THEY DIDN'T DO ANY OF THE TECHNOLOGY. THEY SENT IT OUT TO INDUSTRY. THEY DO THE BIOINFORMATICS. AND WE'RE TALKING ABOUT MASS GENERAL, THE BRIGHAM, HARVARD.

SO A MAJOR ACADEMIC CENTER HAS DECIDED NOT TO DO THE TECHNOLOGY BECAUSE INDUSTRY HAS IT REFINED IN SUCH A WAY, BUT TO HAVE ACCESS TO IT, TO PAY FOR IT, BUT TO REALLY FOCUS ON THE BIOINFORMATICS AND THE INTERPRETATION OF THE INFORMATION. AND I THINK PHIL COMMENTED SLIGHTLY ON THAT, BUT I THINK THAT'S SOMETHING THAT OUGHT TO BE -- I'M SURE YOU THOUGHT ABOUT IT, AND I JUST WANT TO BE SURE WE ALL THINK ABOUT IT. THERE'S MORE THINGS.

DR. TROUNSON: GOOD POINTS. THE TURNOVER IN HARDWARE IS EXTRAORDINARY AND RAPID. ILLUMINA JUST RELEASED THEIR LATEST PRODUCT YESTERDAY. SO WE'VE BEEN IN DISCUSSIONS WITH COMPANIES LIKE ILLUMINA AND OTHERS. WE HAVE TALKED TO A NUMBER OF THESE COMPANIES, ALL OF THE MAJOR COMPANIES IN CALIFORNIA, AND WE BELIEVE THAT WE'RE PROBABLY IN SYNC WITH BOTH YOUR THOUGHTS AND THOSE OF PHIL

PIZZO, THAT IF WE CAN UTILIZE -- YOU UTILIZE THE FRONT END OF A VERY RAPIDLY MOVING SPACE ON HARDWARE, WHY WOULD YOU WANT TO USE LAST YEAR'S PROGRAMS?

WE'RE EVEN OFFERED, FOR EXAMPLE -- THIS IS A SLIGHT ASIDE -- WE WERE OFFERED THE INSTRUMENTS THAT HAVE JUST PASSED OUT OF USE, AND THEY'RE ONLY TWO YEARS OLD. AND THESE ARE MAGNIFICENT, RELATIVELY NEW INSTRUMENTS THAT WE CAN GIVE FREE TO ALL OF THE CALIFORNIA RESEARCH INSTITUTES. BUT WHEN I TALK TO THE HEADS OF THE STEM CELL GROUPS, THEY SAID, NO, WE WANT TO BE -- WE HAVE TO BE WITH THE NEW INSTRUMENTATION AND NOT THE ONE THAT'S JUST PASSED OUT.

SO YOU CAN SEE THAT THERE'S A MASSIVE TURNOVER IN THIS KIND OF HARDWARE. AND SO IF WE CAN UTILIZE WHATEVER PROCESSES THAT KEEP US RIGHT UP TO DATE WITH THIS, I THINK IT WILL CONTINUE TO FALL. I DON'T KNOW TO WHAT LEVEL, BUT IT WILL CONTINUE TO EVOLVE WITH THE DEVELOPMENTS IN THE ACTUAL HARDWARE.

DR. LUBIN: I UNDERSTAND THAT. AND ACTUALLY THE PARTNERS GROUP DOES SEND TO ILLUMINA, BUT I'M NOT SAYING THAT'S THE ONLY COMPANY. WHAT I DO KNOW IS THAT MOST PEOPLE HAVE, AS PHIL MENTIONED, ACCESS TO THE TECHNICAL RESOURCES TO DO THE

ANALYSIS, BUT IT'S THE INTERPRETATION OF THIS MASSIVE AMOUNT OF DATA THAT LIMITS UTILIZATION.

SO MY QUESTION IS IF WE HAD TWO CORE RESOURCES, ARE THESE RESOURCES THAT CHARGE FOR AN INVESTIGATOR THAT'S FUNDED BY CIRM AND WANTS TO DO THIS ON A STEM CELL PRODUCT THAT THEY HAVE BUT DOESN'T HAVE IT IN THEIR BUDGET, BUT IS WILLING TO PAY THESE CORES, AND IS THAT WHAT THE MONEY IS FOR, SO TO HAVE A RESOURCE FOR EVERYONE ELSE? I GOT THE IMPRESSION THAT YOU SAID THE CORES WOULD ALSO BE DOING THEIR OWN RESEARCH, AND SO PART OF THE EVALUATION WOULD BE RELATIVE TO THE KIND OF RESEARCH THAT THEY'RE DOING. I WONDERED IF THAT MAKES SENSE.

DR. TROUNSON: WELL, WE WANTED TO LEAVE OPEN THE OPTION, TO BE HONEST. THERE ARE SOME VERY BIG GENOMICS PROJECT OPPORTUNITIES. FOR EXAMPLE, JUST TAKE ONE IN MANUFACTURING, UNDERSTANDING WHAT THE CHANGES ARE IN CELLS DURING MANUFACTURING, WHAT ARE THE REALLY CRITICAL CHANGES AND BEING DEEP AND UNDERSTANDING WHAT WE CAN PUT UP WITH IN TERMS OF HETEROGENEITY IN THOSE CELLS AND WHAT IS DANGEROUS, FOR EXAMPLE.

SO THAT'S A PRETTY BIG PROJECT THAT HASN'T REALLY BEEN UNDERTAKEN PROPERLY. SO WE THOUGHT WE SHOULD AT LEAST SAY THERE IS THE POSSIBILITY THAT

THIS CENTER WOULD TAKE ON ONE OR SEVERAL OF THESE REALLY MAJOR PROJECTS, BUT THE IMPORTANT PART IS THAT EVERYBODY WHO WANTS TO SHOULD BE ABLE TO ACCESS THAT AND WITH OUR ASSISTANCE BE ABLE TO ACCESS THIS REAL CAPACITY.

AND YOU'RE ASKING ABOUT ACCESSING BOTH THE HARDWARE AND MAKING SURE YOU'RE USING THE APPROPRIATE STANDARDS TO ENABLE YOU TO, IF NECESSARY, GET DOWN TO SINGLE-CELL ANALYSIS. YOU KNOW, YOU'VE REALLY GOT TO PERFORM ON THE VERY TIGHTEST, HIGHEST STANDARDIZED PROCEDURES TO DO THAT.

SO WHAT WE WANT IS THEN THE ADVICE GOING FROM THIS CENTER TO OTHERS IN TERMS OF NOT ONLY HELPING PEOPLE PLAN THE EXPERIMENTS, BUT MAKING SURE THEY'RE USING STANDARDIZED PROCEDURES THAT ENABLE THE BIOINFORMATICS TO GET THE MOST OUT OF THE INFORMATION THAT'S DERIVED.

DR. LUBIN: I GUESS MY QUESTION NOW WAS SAY I WAS WORKING IN THE LAB ON STEM CELLS IN THE PLACENTA AND I WANTED TO KNOW WHETHER THEIR EPIGENETIC PROFILE WAS THE SAME AS STEM CELLS FROM ANOTHER SOURCE OR IPS CELLS. COULD I PURCHASE THIS SERVICE FROM THE CORE? IS THAT WHAT YOU'RE SEEING?

DR. DEWITT: THE WAY THAT WE'RE

STRUCTURING IT INITIALLY IS THAT THERE WILL BE MONEY ALLOCATED TO THE CENTERS WHO WILL THEN HAVE THAT MONEY AVAILABLE FOR COLLABORATION WHERE THEY'LL PROVIDE THE HUMAN RESOURCES IN BIOINFORMATICS AND COMPUTING AND EXPERIMENTAL DESIGN. AND THESE ARE ALL BOTTLENECKS THAT WE'VE IDENTIFIED THAT STEM CELL RESEARCHERS WHO HAVE NOT ENGAGED IN GENOMICS RESEARCH WOULD ENCOUNTER.

AND THEN EVENTUALLY ONCE THE INFRASTRUCTURE EXISTS, THEY WOULD HOPEFULLY SEGUE TO A FEE-FOR-SERVICE MODEL THAT WOULD SUSTAIN THEM BEYOND THE FIVE-YEAR PERIOD OF THE GRANT. ACTUALLY THIS IS MODELED ON THE BROAD INSTITUTE IN BOSTON WHICH HAS A SIMILAR STRUCTURE TO ENGAGE RESEARCHERS BEYOND THE BROAD FACULTY FOR GENOMICS RESEARCH.

DR. LUBIN: OKAY.

DR. MELMED: THAT'S CALLED OUT IN THE RFA?

CHAIRMAN SHEEHY: THE RFA HASN'T BEEN ISSUED YET, SO WE HAVE A CONCEPT PROPOSAL. AND PEOPLE MAY WANT TO LOOK AT THE FUNDED ACTIVITIES PORTION AND SCOPE OF FUNDED ACTIVITIES AND ELIGIBILITY CRITERIA BECAUSE WE DON'T DIRECTLY WRITE THE RFA FROM THE BOARD LEVEL. BUT THE CONCEPT PROPOSAL GIVES US THE ABILITY TO GIVE SOME DIRECTION TO STAFF WHO WRITE THE RFA.

DR. OLSON HAD A QUESTION.

DR. OLSON: I JUST WANTED TO MAKE A COMMENT. I THINK ONE WAY FOR YOU TO LOOK AT THIS IS REALLY AS, I DON'T WANT TO CALL IT A SUPER SHARED LAB, BUT IT IS PROVIDING A CORE COMPETENCY. AND IN THAT CONTEXT, THE FUNDING -- THERE IS SOME OPERATING FUNDING ALLOCATED OR SOME FUNDING ALLOCATED TO SUPPORT COLLABORATIONS WITH OTHER RESEARCHERS, TO PROVIDE THE RESOURCES TO DO GENOMICS PROJECTS THAT THOSE RESEARCHERS HAVE TO PROVIDE CORE RESOURCES. SO IN THE SAME WAY THAT A SHARED LAB MAYBE HAS AN IMAGING CAPABILITY, IT WILL PROVIDE RESOURCES TO THE COMMUNITY TO FACILITATE THEM DOING IMAGING STUDIES. SO I THINK THAT'S WHAT -- AND SO, YES, THERE IS SOME COVERAGE OF THAT.

DR. STEWARD: I'D LIKE TO GET ON THE LIST TO ASK A QUESTION.

DR. YAFFE: THIS WILL BE SPELLED OUT VERY CLEARLY IN THE RFA. WE WILL SET FORTH ALL OF THE INFORMATION ABOUT THE ACCESS TO RESEARCHERS AND THE ACTIVITIES THAT THE CENTERS WILL PROVIDE STEM CELL RESEARCHERS IN CALIFORNIA.

DR. LUBIN: YOU WANT US TO APPROVE THE CONCEPT BEFORE WE SEE THAT?

CHAIRMAN SHEEHY: THAT'S HOW THE THINGS --

THAT'S KIND OF OUR PROCESS. THE ICOC CANNOT DIRECTLY APPROVE AN RFA FOR LEGAL REASONS, BUT WE CAN PROVIDE POLICY DIRECTION THROUGH THE CONCEPT PROPOSAL, WHICH IS THE -- YOU HAVE THAT IN YOUR DOCUMENT PACK. AND I REALLY DO ENCOURAGE MEMBERS TO LOOK AT ESPECIALLY THE LAST TWO PAGES. AND, YOU KNOW, YOU LOOK AT FUNDED ACTIVITIES AND ELIGIBILITY CRITERIA AND BUDGET.

IF YOU HAVE -- IF YOU WANT TO PROVIDE DIRECTION, THEN I THINK WHEN WE DO A MOTION, IF WE DO A MOTION TO APPROVE, PERHAPS ALTERING THAT LANGUAGE OR AUGMENTING THAT LANGUAGE IS THE BEST WAY IN ORDER TO IMPACT WHAT THE FINAL RFA WILL SAY. AM I MAKING SENSE? THIS IS KIND OF YOUR WHOLE BITE AT THE APPLE IS THIS DOCUMENT. AND THEN THE RFA IS ISSUED SEPARATELY BY STAFF. THAT'S PUT IN PLACE FOR LEGAL REASONS DUE TO CONFLICT OF INTEREST ISSUES.

BUT DID YOU HAVE OTHER QUESTIONS, DR. LUBIN?

DR. LUBIN: I'M DONE. I MONOPOLIZED ENOUGH OF THE TIME ON MY QUESTIONS.

DR. MELMED: I HAVE A COUPLE OF QUESTIONS, BUT I THINK SOME OF THEM MAY HAVE BEEN ANSWERED BY YOUR EXPLANATION OF THE CONSTRAINTS WE'RE UNDER FOR LOOKING AT THE RFA.

ONE COMMENT IS THAT I THINK THE RFA SHOULD REALLY, IF WE CAN COMMENT, REALLY SPELL OUT THE EXPECTATION FOR THE BALANCE OF CREATIVE SCIENCE VERSUS CORE SERVICE. WE'RE GOING TO FIND A LOT OF FOR-PROFITS ARE GOING TO COME IN WITH A MAJOR CORE SERVICE APPLICATION AND NOT MUCH SCIENCE. AND I WONDERED IF WE COULD ADDRESS THAT.

SECOND COMMENT I HAVE IS BASICALLY AN EXTENSION OF PHIL'S CONCERN, WHICH I THINK WE ALL SHARE, AND THAT IS THE INFORMATICS ISSUE. TO ASK STAFF DID THEY CONSIDER AN INFORMATICS CORE? BECAUSE A LOT OF WHAT'S PROPOSED HERE I THINK INDUSTRY CAN PROVIDE AND IS PROVIDING ESPECIALLY IN THE SAN DIEGO AREA. AND I'M NOT SURE THAT THE BOTTLENECK OF INFORMATICS IS REALLY GOING TO BE UNPLUGGED WITHOUT A MAJOR CORE PROJECT FOR CALIFORNIA FOR STEM CELLS.

DR. DEWITT: COULD WE GO TO SLIDE 7, PLEASE, BECAUSE ACTUALLY WE DID IDENTIFY THIS AS THE MAJOR BOTTLENECK, NOT JUST FOR STEM CELLS, BUT FOR ANY TYPE OF GENOMICS APPROACH. SO YOU SHOULD BE ON THE SLIDE THAT SAYS THE STEM CELL GENOMICS PIPELINE. AND THIS INDICATES THE MAJOR STEPS IN GENOMICS RESEARCH. AND WHAT YOU'RE REFERRING TO IS ESSENTIALLY A COMMODITY NOW IS NEXT-GENERATION

SEQUENCING WHERE YOU CAN SEND OUT SAMPLES TO CHINA OR TO COMPLETE GENOMICS OR TO ILLUMINA AND HAVE THEM COME BACK IN A FEW WEEKS FOR THE COST OF 5,000, $10,000 PER GENOME. AND, AGAIN, THAT COST IS DROPPING. THIS HAS BECOME A COMMODITY. THIS IS NOT SOMETHING WE PLAN TO FUND IN TERMS OF SETTING UP RESEARCHERS TO DO THAT BECAUSE THEY FEEL THEY EXIST.

WHAT'S SHOWN IN RED ARE THE PLACES IN THE PIPELINE WHERE WE FEEL THERE ARE NOT RESOURCES. IT'S NOT AN INFRASTRUCTURE. AND THIS DOESN'T JUST APPLY TO STEM CELLS AGAIN. THIS IS ACROSS THE BOARD. DATA COORDINATION, DATA ANALYSIS IS A BIG ONE, AND THEN STANDARDIZED PROCEDURES FOR PRODUCING SAMPLES THAT CAN BE AT THE END OF THE PIPELINE AND WHERE THERE CAN BE BIOLOGICAL RESULTS EMANATING FROM THIS DATA.

SO IF YOU SEE ON THE SLIDE, IT SAYS CORE ACTIVITIES. WE WANT TO SUPPORT THIS AS A CORE ACTIVITY FOR THE GENOMICS ACTIVITIES. AND I THINK WE LOOKED AT THE COST OF DOING THIS AND HOW IT COULD BE SET UP, AND I THINK THAT ANYONE WHO APPLIES FOR FUNDING FROM CIRM WOULD HAVE TO SOLVE THIS PROBLEM EITHER BY ENGAGING WITH CONTRACT PROVIDERS OR BY HAVING THOSE RESOURCES THEMSELVES. AND WE WOULD NOT FUND ACTIVITIES THAT DID NOT SOLVE THIS PROBLEM.

THIS IS VERY MUCH A CENTERPIECE OF WHAT WE WANT TO FUND.

AND THEN SUPERIMPOSED ON THAT ARE THE RESEARCH ACTIVITIES THAT WOULD COME UP FROM COLLABORATORS THROUGHOUT THE STATE WHO WOULD WORK WITH THE CENTERS OR THE CENTERS THEMSELVES WHO WOULD USE THIS PIPELINE, THAT WE WOULD SUPPORT BOTH IN TERMS OF HR AND IN TERMS OF PROVIDING FUNDS FOR GETTING THE SEQUENCING AND GETTING THE ANALYTICS DONE AND, IMPORTANTLY, AS YOU SAY, THE DATA COORDINATION, THE DATA ANALYSIS, THE DATA STORAGE. ALL OF THE THINGS ABOUT DATA, AS YOU KNOW, IS A KEY BOTTLENECK IN OBTAINING USEFUL INFORMATION FROM GENOMICS.

SO WE ARE VERY MUCH AWARE OF THIS AS BEING A VERY KEY THING FOR US TO FUND AND WOULD MAKE OUR REVIEWERS AWARE OF THAT PRIORITY.

DR. PIZZO: CAN I WHENEVER WE'RE READY ADD A COMMENT TO THAT?

CHAIRMAN SHEEHY: DR. MELMED HAS THE FLOOR.

DR. PIZZO: HE CAN FINISH. I'M HAPPY TO WAIT.

DR. MELMED: I YIELD THE FLOOR. IT'S OKAY.

DR. PIZZO: WELL, I JUST WAS REALLY GOING TO GO BACK TO MY EARLIER COMMENTS AND AMPLIFY WHAT'S JUST BEEN SAID. I THINK THE WAY THE RFA IS CONSTRUCTED WILL BE VERY INFORMATIVE. FROM MY PERSPECTIVE, AT LEAST LOOKING AT IT, AND HERE I SHOULD PROBABLY SAY WITH DISCLOSURE, OUR INSTITUTION IS INVESTING A LOT OF ENERGY AND RESOURCES INTO OUR GENOMICS EFFORTS, AS I'M SURE OTHER CENTERS ARE IN CALIFORNIA. WHAT I'M LOOKING AT WITH THAT DISCLOSURE IS HOW DO WE OPTIMIZE WHAT'S ALREADY BEING PUT IN PLACE? AND, THEREFORE, TO ME THIS IS, AS I SAID EARLIER, AND EVERYONE ELSE HAS COMMENTED, THIS IS IN A SENSE LESS ABOUT TECHNOLOGY AND MORE ABOUT WHAT COULD WE DO THAT WOULD BE REALLY UNIQUE AND COLLABORATIVE IN TERMS OF HOW WE HANDLE, ANALYZE, PROCESS, SHARE, AND LEAD FUTURE ALGORITHM DEVELOPMENTS IN HOW TO HANDLE THESE DATA.

AND SO I THINK I WOULD LOVE TO SEE OR BE SURE THAT WE CAN SEE POTENTIALLY APPLICATIONS THAT MIGHT BE 90 PERCENT ABOUT DATA ANALYTICS AND 10 PERCENT ABOUT ACTUAL HARDWARE AS COMPARED TO EMPHASIZING THE HARDWARE, WHICH I THINK WE SHOULD ENCOURAGE PEOPLE TO GET IN SORT OF OTHER WAYS. I DON'T WANT TO MAKE ONE THE ENEMY OF THE OTHER, BUT I THINK THE OPPORTUNITY IS REALLY, AS WE'VE ALL BEEN

SAYING AND WAS JUST MENTIONED, IS REALLY ABOUT HOW CAN WE ADVANCE BEYOND THE REST OF THE NATION AND SOME OF THE BIGGER CENTERS, INCLUDING THE BROAD, IN HOW THIS INFORMATION IS PROCESSED AND HANDLED.

DR. MELMED: I THOROUGHLY ENDORSE WHAT YOU ARE SAYING. MY CONCERN IS THAT THE MEGA, GIANT FOR-PROFIT HARDWARE COMPANIES IN CALIFORNIA ARE GOING TO COME IN FOR THIS AND ARE GOING TO COMPETE VERY AGGRESSIVELY, AND I DON'T THINK THAT'S OUR INTENT.

DR. YAFFE: I HOPE WE HAVEN'T GIVEN THE IMPRESSION THIS IS ABOUT HARDWARE. THIS INITIATIVE IS NOT ABOUT HARDWARE. WHEN WE SAY TECHNOLOGY DEVELOPMENT, WE CERTAINLY INCLUDE IN THAT AND PRIMARILY MEAN INFORMATION TECHNOLOGY. THERE MAY BE SOME TECHNOLOGY DEVELOPMENT WITH REGARD TO THINGS SUCH AS SINGLE-CELL ANALYSIS, GENOMIC ANALYSIS, BUT WE CERTAINLY INCLUDE BIOINFORMATICS AS AN ENORMOUS COMPONENT OF THIS. THAT IS IN DATA ANALYSIS, IT'S IN DATA COORDINATION, TO SOME EXTENT IT'S IN TECHNOLOGY DEVELOPMENT THE INFORMATION TECHNOLOGY. SO WE'RE ON THE SAME PAGE WITH YOU ABOUT THE IMPORTANCE OF THAT ACTIVITY.

DR. MELMED: EXCEPT THAT THE COMPETING COMPANIES WILL CLOSE THEIR PRESENTATION IN TERMS OF

TECHNOLOGY AND NOT OF HARDWARE. AND THEY WILL PRESENT IT AS SCIENCE RATHER THAN MARKETING, AND I'M VERY CONCERNED ABOUT THAT BECAUSE THEY ARE VERY COMPETITIVE AND HIGHLY AGGRESSIVE COMPANIES.

DR. PIZZO: WE WANT TO CONVEY, AND I THINK I AGREE WITH THAT LAST STATEMENT, AND I THINK WE REALLY WANT TO BE -- THIS SHOULD BE ABOUT ADVANCING THE FUTURE RATHER THAN JUST KIND OF DOING MORE RAPIDLY WHAT WE ARE ALREADY CONDUCTING. AND THAT'S WHERE I THINK THE LEADING EDGE IS. EVERYONE HAS SAID IT AND WE ALL AGREE. THIS IS APPLICABLE TO STEM CELLS, BUT IT BUILDS ON WHAT'S GOING TO BE DONE IN ALL THE OTHER AREAS OF SCIENCE AS WELL.

DR. TROUNSON: THERE REALLY HAS TO BE A TRANSFORMATIVE STEP, PHIL. THAT'S NOT THE INTENTION. WE MUST DO THAT AND SO --

DR. PIZZO: IT'S REALLY JUST HOW IT'S CONVEYED. I THINK IF YOU CAN CONVEY THE RFA SO THAT IT PUSHES PEOPLE TO THINK ABOUT REALLY UTILIZING THINGS IN UNIQUE WAYS. PLUS WHICH, IF WE'RE TALKING ABOUT HOW WE HANDLE THAT DATA, THAT ALSO MAKES US A MORE COLLABORATIVE OPPORTUNITY BECAUSE WE CAN DO THAT ACROSS INSTITUTIONS MORE EASILY THAN IF THE HARDWARE IS THE CONSTRAINING ELEMENT.

DR. DEWITT: IF I COULD JUST MAKE A

COMMENT. WE VERY MUCH WANT TO CONSTRUCT THE RFA TO REQUIRE THAT MANY ELEMENTS OF WHAT I'VE SHOWN IN THAT SLIDE AS PIPELINE IS REPRESENTED BY THE PROPOSAL. SO WE DON'T EXPECT COMPANIES TO JUST COME IN AND SAY WE HAVE SEQUENCING HARDWARE AND WE CAN PROVIDE SEQUENCING. WE EXPECT OUR APPLICANTS THAT WE WOULD TAKE SERIOUSLY AND FUND TO HAVE THIS WHOLE PROCESS THOUGHT OUT AND HAVE ALLOCATED RESOURCES AND HAVE COLLABORATORS AND CO-PI'S WHO CAN HELP CARRY OUT THE ENTIRE PROCESS, WHICH, AS YOU SAY, IS VERY MUCH AN INTELLECTUAL HR-DRIVEN PURSUIT THAT IS NOT ABOUT HARDWARE. SO WE VERY MUCH AGREE WITH YOUR POINT THERE.

DR. MELMED: EXCEPT THAT THE PERCEPTION BY THE COMPANIES WILL BE DIFFERENT, AND THEY VIEW THIS AS AN OPPORTUNITY TO --

DR. YAFFE: WE WILL DO OUR BEST IN WRITING THE RFA TO CONVEY THAT POINT, DR. MELMED.

DR. OLSON: HAVING SAID THAT, I DO THINK IT'S IMPORTANT TO RECOGNIZE THAT THE INSTITUTIONS THEMSELVES MAY WISH TO EXPLORE COLLABORATIONS WITH COMPANIES WHERE APPROPRIATE. I THINK THERE'S POSSIBILITIES FOR CONTRIBUTIONS WHERE IT MAKES SENSE TO STRENGTHEN THE PROPOSAL.

CHAIRMAN SHEEHY: DO YOU HAVE MORE

COMMENTS, DR. MELMED, OR SHOULD I PASS ON TO DR. STEWARD?

DR. MELMED: I'VE SAID ENOUGH. THANK YOU.

CHAIRMAN SHEEHY: IF YOU HAVE MORE, PLEASE.

DR. MELMED: MY ONLY CONCERN IS THAT, MAYBE SOMEONE CAN EXPLAIN TO US, I WOULD BE UNCOMFORTABLE VOTING ON THIS UNLESS WE SEE THE RFA.

CHAIRMAN SHEEHY: WELL, OKAY. AGAIN, THIS GOES BACK TO OUR STRUCTURAL ISSUE WHICH IS FUNDAMENTALLY A LEGAL ISSUE. THE BOARD CANNOT VOTE ON AN RFA.

DR. MELMED: I'M NOT ASKING TO VOTE ON AN RFA, BUT I'M SAYING FOR US TO VOTE ON THIS COMMITTEE ON THIS MOTION WITHOUT HAVING SEEN THE RFA, WE'RE NOT ASKING TO APPROVE IT, BUT WE'RE ASKING, I THINK, TO READ IT.

CHAIRMAN SHEEHY: WHAT THE PROBLEM IS IS THAT THIS IS -- JAMES HARRISON, ARE YOU ON THE PHONE? MAYBE YOU CAN UNTANGLE THIS IF YOU'RE ON THE PHONE WITH US.

MR. HARRISON: I AM, JEFF. DR. MELMED, WE CAN TALK ABOUT THIS OFFLINE IN GREATER DEPTH. BUT IN ORDER TO PROTECT AGAINST CONFLICTS OF INTEREST OR EVEN THE APPEARANCE OF CONFLICTS OF INTEREST, WE

HAVE BEEN VERY CAREFUL TO DRAW THE LINE AT CONCEPT APPROVAL BY THE BOARD OF FUNDING PLANS. AND WE HAVE NOT EVER INVOLVED THE BOARD IN THE DRAFTING OR REVIEW OF RFA'S.

SO I CAN DESCRIBE THE LEGAL RATIONALE TO YOU IN GREATER DETAIL OFFLINE, BUT THAT IS THE LINE THAT WE HAVE CONSISTENTLY DRAWN AND ADHERED TO.

CHAIRMAN SHEEHY: SO IF I CAN OFFER PERHAPS A SOLUTION. YOU DO HAVE A CONCEPT PROPOSAL HERE THAT SEEMS TO HAVE BEEN WRITTEN BROADLY AND MAY OR MAY NOT CAPTURE ADEQUATELY THE CONCERNS THAT HAVE BEEN EXPRESSED BY DR. PIZZO OR DR. MELMED. SO BEFORE -- IT MAY BE A LOT TO ASK THAT THERE BE AMENDMENTS THAT COULD BE ENTERTAINED TODAY BECAUSE THIS DOES SEEM LIKE A COMPLEX SUBJECT. IF YOU DO HAVE LANGUAGE THAT YOU WOULD PREFER TO SEE INSERTED, I THINK WE SHOULD TAKE THIS OPPORTUNITY. BUT IF YOU'D LIKE A LITTLE MORE TIME FOR DELIBERATION, MAYBE ONE OF THE THINGS WE CAN CONSIDER COMING OUT IS SETTING UP A DIALOGUE WITH DR. DEWITT OR DR. YAFFE IN ORDER TO FURTHER REFINE THIS TO KIND OF CAPTURE SOME OF THIS NUANCE THAT YOU'RE PRESENTING OR SOME OF THIS DEAL THAT YOU'RE PRESENTING SO THAT WE CAN HAVE A DEGREE OF CLARITY THAT MAKES YOU COMFORTABLE VOTING ON IT.

I TOTALLY UNDERSTAND YOUR TREPIDATION. YOU'RE SITTING HERE WITH A DOCUMENT THAT'S WRITTEN VERY BROADLY AND COULD GO ALL SORTS OF DIRECTIONS, AND YOU'D LIKE TO DIRECT IT A LITTLE MORE IN A CERTAIN WAY. AND I DON'T THINK -- STAFF SEEMS TO BE IN AGREEMENT WITH YOU. IT'S JUST CONFORMING WHAT YOU'RE SAYING WITH WHAT'S IN THE DOCUMENT, AND THAT IS NOT AN INSUPERABLE TASK IN THE WEEK WE HAVE BEFORE THE ICOC MEETING.

MR. HARRISON: JEFF, I DON'T BELIEVE WE HAVE A QUORUM FOR THE SUBCOMMITTEE AT THIS POINT IN TIME.

MS. FEIT: I JUST JOINED.

MR. HARRISON: I TAKE THAT BACK. WE DO HAVE A QUORUM.

MS. FEIT: I WAS LATE.

DR. LUBIN: I HAVE TO LEAVE NOW OR SOON.

CHAIRMAN SHEEHY: OS, DO YOU HAVE ANY COMMENTS YOU WANT TO MAKE?

DR. STEWARD: I DO ACTUALLY HAVE SOMETHING THAT HASN'T BEEN DISCUSSED, AND I WOULD LIKE TO RAISE IT. SO ONE OF THE THINGS THAT YOU COULD EASILY IMAGINE IS THAT AT SOME POINT IN TIME CAPACITY IS GOING TO BE RATE LIMITING IN TERMS OF DEMAND HERE. I'M THINKING NOT ONLY IN TERMS OF THE

REQUESTS FOR SERVICE, IF YOU WANT TO CALL IT THAT, BUT ALSO THE BALANCE BETWEEN THE RESEARCH ACTIVITIES THAT ARE ACTUALLY INITIATED BY THE CORE VERSUS THE OUTSIDE COLLABORATIVE REQUESTS.

SO MY QUESTION REALLY IS WHO'S GOING TO MAKE THE DECISIONS FOR TRIAGE AND SELECTION OF PROJECTS? HOW IS THAT GOING TO BE DONE? IS IT GOING TO BE TOP DOWN AND BOTTOM UP? AND JUST GENERAL, I GUESS, ISSUES OF HOW THIS IS ALL GOING TO BE HANDLED.

DR. LUBIN: THAT'S A VERY IMPORTANT QUESTION.

DR. DEWITT: I CAN ANSWER THAT QUESTION. SO WE DISCUSSED WITH OTHER GENOMICS FUNDERS, INCLUDING THE NIH NCODE PROJECT AND THE BROAD INSTITUTE, TO SEE HOW THEY HANDLE THIS BECAUSE, AGAIN, THEY ARE TRYING TO MAKE THEIR FUND PLATFORMS THAT WOULD BE BROADLY AVAILABLE TO THE COMMUNITY, ALTHOUGH, AS YOU SAY, IT CAN'T BE TOO BROAD BECAUSE IT'S GOING TO BE LIMITED RESOURCES. SO THEY ALLOCATE A POOL OF MONEY OF FUNDS TO THESE INSTITUTES WHO SELECT COLLABORATORS ON SORT OF A ROLLING BASIS, AND THEN THIS IS VETTED BY THE FUNDERS EVERY YEAR.

AND THE WAY THAT THE COLLABORATORS ARE

SELECTED IS THROUGH SCIENTIFIC ADVISORY BOARDS THAT ARE PUT IN PLACE BY THE INSTITUTE, BY THE CENTERS IN THIS CASE, AND WHERE THERE COULD BE CIRM REPRESENTATIVES ON THOSE BOARDS AS WELL. AND THEN CIRM WOULD JUST BE BASICALLY MONITORING THEIR PROGRESS AND MONITORING THESE PROPOSALS ON A YEARLY BASIS.

ALSO IN THE RFA AND IN THE PROPOSALS THAT ARE EVALUATED, WE WOULD EXPECT THAT THEY PUT IN PLACE A VERY GOOD PLAN FOR HOW THIS IS DONE. SO THAT'S -- SO BASED ON THESE OTHER MODELS, THAT'S HOW WE PROPOSE ALLOCATING FUNDS FOR COLLABORATIONS.

DR. STEWARD: IF I COULD JUST FOLLOW UP. SO ONE OF THE THINGS THAT COMES TO MIND IS I GUESS IF YOU WANT TO THINK ABOUT IT, THE LEGAL ISSUES INVOLVED IN CIRM DOLLARS AND SOME OTHER ENTITY APPROVING THE EXPENDITURE OF THESE ESSENTIALLY STATE FUNDS. AND SO HOW HAS THAT -- HOW HAVE YOU THOUGHT ABOUT THAT? ARE THESE GOING TO BE -- ARE THEY GOING TO HAVE A POT OF MONEY THAT THEY'RE GOING TO BE ABLE TO SAY GOES HERE, GOES THERE, OR IS THAT SOMETHING THAT IS GOING TO BE A SEPARATE REVIEW PROCESS IF IT REQUIRES THE EXPENDITURE OF CIRM FUNDS?

DR. OLSON: I JUST WANT TO REMIND MEMBERS OF THE SUBCOMMITTEE THAT THE SHARED LABS, IN FACT,

ONE OF THE KEY THINGS WAS THE KINDS OF COMMITTEES THEY WOULD SET UP, ALSO FOR THE MAJOR FACILITIES FOR USING THE CORE RESOURCES, THE KINDS OF MANAGEMENT COMMITTEES THAT THEY WOULD SET UP TO ESSENTIALLY UTILIZE, IF YOU WOULD LIKE, CORE RESOURCES OR SHARED LAB RESOURCES. SO WHEN WE TALK ABOUT SUPPORT COLLABORATIVE RESEARCH, WE'RE TALKING ABOUT PROVIDING CENTER OF EXCELLENCE RESOURCES TO DO THAT. AND SO THE PROCESS -- THE MANAGEMENT COMMITTEE BY WHICH THEY WOULD SET UP, THE COMPOSITION OF THAT COMMITTEE, THE CRITERIA THEY WOULD USE, THE BALANCE BETWEEN EXTERNAL PROJECTS AND INTERNAL PROJECTS, ALL OF THOSE ARE THE KINDS OF CONSIDERATIONS THAT ONE HAS LOOKED AT IN USE OF THE MAJOR FACILITIES, CORE RESOURCES, IN USE OF SHARED LAB CORE RESOURCES. AND I THINK COMPARABLE TYPES OF THINGS WOULD BE APPLICABLE HERE AS WELL.

CHAIRMAN SHEEHY: SO, YOU KNOW, I THINK WE'RE GETTING NEAR -- WE'RE KIND OF GETTING TO THE END OF THE TIME WE HAD ALLOTTED FOR THIS, AND I DON'T WANT TO RUSH A DECISION. SO I WOULD TAKE A MOTION TO SUGGEST MOVING THIS FORWARD TO THE BOARD, TO DELAY THIS, TO NOT SUGGEST MOVING IT FORWARD TO THE BOARD. WHERE IS PEOPLE'S COMFORT LEVEL ON THIS PARTICULAR CONCEPT? TO OFFER ADDITIONAL INPUT

BETWEEN NOW AND THE BOARD? I'M VERY FLEXIBLE, BUT I'M NOT GETTING A CLEAR SENSE THAT WE HAD A STRONG CONSENSUS YET. MAYBE I MISSED IT.

MR. TORRES: I HAD TO JOIN LATE. I'LL RELY UPON YOUR JUDGMENT HERE, JEFF.

CHAIRMAN SHEEHY: CAN I ASK PERHAPS DR. PIZZO OR DR. MELMED, DR. LUBIN, DR. STEWARD, THE FOLKS WHO HAVE BEEN COMMENTING, IF THEY CAN MAYBE GIVE ME SOME DIRECTION ON THEIR COMFORT LEVEL, WHETHER THEY'D LIKE TO HAVE MORE INPUT ON THIS BEFORE WE MOVE IT FORWARD, WHETHER THAT CAN BE DONE IN THE WEEK BETWEEN NOW AND THE BOARD INFORMALLY WITH DR. DEWITT AND DR. YAFFE, OR IF THEY THINK A MORE FORMAL DIRECTION SHOULD BE MADE.

DR. PIZZO: I THINK THAT THE QUESTIONS THAT WE'VE DISCUSSED AND THE RESPONSES THAT WE'VE HEARD HAVE ACTUALLY GIVEN ME COMFORT ABOUT SEEING THIS MOVE FORWARD. I THINK THERE ARE SOME IMPORTANT ISSUES THAT DO CONTINUE TO NEED TO BE EXPLORED, BUT I THINK I'M COMFORTABLE WITH THE INTERCHANGE THAT WE'VE HAD.

DR. MELMED: I'M ALSO COMFORTABLE. I THINK STAFF HAS HEARD OUR CONCERNS AND WILL KNOW HOW TO RESPOND APPROPRIATELY.

DR. LUBIN: SOUNDS FINE TO ME AS WELL.

DR. STEWARD: I'M FINE WITH THAT TOO. I THINK THERE ARE A LOT OF THINGS TO THINK ABOUT AND DISCUSS, BUT I THINK MOVING FORWARD IS THE APPROPRIATE STEP AT THIS POINT.

CHAIRMAN SHEEHY: SO PERHAPS A MOTION TO MOVE THIS FORWARD.

DR. PIZZO: I'LL MOVE THAT.

MR. TORRES: SO MOVED.

DR. FRIEDMAN: I'LL SECOND.

CHAIRMAN SHEEHY: DON REED HERE. IS THERE ANY PUBLIC COMMENT AT ANY OF THE OTHER SITES?

MR. REED: I HAVE TWO THINGS. NO. 1, AS A PATIENT ADVOCATE, I ALWAYS STRUGGLE TO KEEP UP WITH WHAT YOU GUYS KNOW SO WELL. THE ONLY THING I KNOW ABOUT WHAT YOU'RE TALKING ABOUT IS THAT WHEN STEM CELLS ARE MULTIPLIED TO SCALE UP TO GET A WHOLE QUANTITY, YOU HAVE TO BE SURE THEY STAY STABLE, AND THIS MIGHT BE A WAY TO MAKE SURE THEY DO STAY STABLE. SO WHEN YOU MAKE THE PROPOSAL FOR THE ICOC AND THE PUBLIC, I WOULD LIKE SOMEONE TO BE ABLE TO SAY CLEARLY THE VALUE OF THE -- SCIENTIFIC VALUE OF THIS SO THE PATIENT ADVOCATES CAN UNDERSTAND AND SUPPORT.

SECONDLY, I DON'T UNDERSTAND IF THIS IS SOMETHING THAT PEOPLE CAN DROP OFF THEIR STUFF AND

COME BACK AND PICK IT UP, OR IF THEY HAVE TO MOVE IN BECAUSE THERE'S A SIGNIFICANT DIFFERENCE BETWEEN HAVING A CENTRALLY LOCATED PLACE, ONE, OR TWO DIFFERENT PLACES. TO GO WITH TWO DIFFERENT PLACES, THAT'S SOMETHING. IF YOU WENT WITH MORE THAN ONE PLACE, IT SEEMS TO ME YOU'D HAVE A FINANCIAL CUSHION, YOU COULD KEEP YOUR 40 MILLION, BUT HAVE A FINANCIAL CUSHION FOR THE NEW STUFF THAT'S BEING BUILT. I GOT THE IMPRESSION THAT THIS IS A VERY NEW FIELD AND THERE'S A LOT OF NEW EQUIPMENT COMING OUT RIGHT NOW. I WONDER IF IT MIGHT NOT BE SMART TO KEEP A CUSHION FINANCIALLY FOR THE NEW STUFF THAT WILL BE DEVELOPED AS WE MOVE ALONG.

CHAIRMAN SHEEHY: ARE THERE OTHER PUBLIC COMMENTS?

MR. HARRISON: COULD I JUST GET A CLARIFICATION ON WHO THE SECOND WAS?

DR. FRIEDMAN: MIKE FRIEDMAN.

MR. HARRISON: THANK YOU, DR. FRIEDMAN.

DR. LUBIN: I'M SORRY. I HAVE TO LEAVE NOW, BUT YOU HEARD MY COMMENTS.

CHAIRMAN SHEEHY: WE CAN TAKE YOUR VOTE. I THINK WE NEED YOU FOR QUORUM. ARE YOU A YES, BERT?

DR. LUBIN: YES.

DR. FRIEDMAN: I'M SORRY. IT'S MIKE FRIEDMAN. WOULD YOU PLEASE RECORD MY YES?

CHAIRMAN SHEEHY: SURE.

DR. MELMED: ALSO MY YES. I HAVE TO LEAVE. THANK YOU.

CHAIRMAN SHEEHY: CAN WE DO A QUICK ROLL CALL.

MS. BONNEVILLE: SUE BRYANT.

DR. BRYANT: YES.

MS. BONNEVILLE: MARCY FEIT. MICHAEL FRIEDMAN IS YES. LUBIN IS YES. SHLOMO MELMED IS YES.

PHIL PIZZO.

DR. PIZZO: YES.

MS. BONNEVILLE: DUANE ROTH. JOAN SAMUELSON. JEFF SHEEHY.

CHAIRMAN SHEEHY: YES.

MS. BONNEVILLE: OS STEWARD.

DR. STEWARD: YES.

MS. BONNEVILLE: ART TORRES.

MR. TORRES: AYE.

MS. BONNEVILLE: JONATHAN THOMAS.

CHAIRMAN THOMAS: YES.

MS. BONNEVILLE: KRISTINA VUORI.

CHAIRMAN SHEEHY: COULD WE SEE IF MARCY IS

STILL ON?

MS. FEIT: I DID SAY YES.

MS. BONNEVILLE: GREAT. THANK YOU.

CHAIRMAN SHEEHY: OKAY. I THINK, JAMES, DOES THAT FULFILL OUR QUORUM ISSUES?

MR. HARRISON: YES. THE MOTION PASSES WITH TEN YES VOTES.

CHAIRMAN SHEEHY: GREAT. I WANT TO, UNLESS SOMEONE HAS SOMETHING THEY'D LIKE TO INTRODUCE, I'M HAPPY TO ADJOURN THE MEETING IF EVERYBODY IS SATISFIED. THANK YOU FOR YOUR TIME AND THANK YOU TO STAFF.

(THE MEETING WAS THEN CONCLUDED AT 11:10 A.M.)

REPORTER'S CERTIFICATE

I, BETH C. DRAIN, A CERTIFIED SHORTHAND REPORTER IN AND FOR THE STATE OF CALIFORNIA, HEREBY CERTIFY THAT THE FOREGOING TRANSCRIPT OF THE TELEPHONIC PROCEEDINGS BEFORE THE SCIENCE SUBCOMMITTEE OF THE INDEPENDENT CITIZEN'S OVERSIGHT COMMITTEE OF THE CALIFORNIA INSTITUTE FOR REGENERATIVE MEDICINE IN THE MATTER OF ITS REGULAR MEETING HELD ON WEDNESDAY, JANUARY 11, 2012, WAS HELD AS HEREIN APPEARS AND THAT THIS IS THE ORIGINAL TRANSCRIPT THEREOF AND THAT THE STATEMENTS THAT APPEAR IN THIS TRANSCRIPT WERE REPORTED STENOGRAPHICALLY BY ME AND TRANSCRIBED BY ME. I ALSO CERTIFY THAT THIS TRANSCRIPT IS A TRUE AND ACCURATE RECORD OF THE PROCEEDING.

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