Advice for Young Investigators Involved in Clinical and Translational Research or How I did some of it

Richard J. Barohn, M.D.
Chairman, Department of Neurology
Gertrude and Dewey Ziegler Professor of Neurology
University Distinguished Professor
Vice Chancellor for Research
President, Research Institute
University of Kansas Medical Center
My Areas of Research

Neuromuscular Disease

• Observations
• Natural history
• Outcome measures
• Clinical trials
• New – comparative effectiveness research, patient centered research

In:

• Motor neuron disease (ALS)
• Neuropathies
• Neuromuscular junction disorders (myasthenia gravis)
• Myopathies (genetic and inflammatory)
Barohn’s Barriers to Clinical/Translational Research

(These are ESSENTIALS!)

• Idea
• Interest/desire
• Talent
• Training
• Time
• Team
• Space
• Money
• Subjects
What is Clinical Research?

Types of clinical research:

- Retrospective – looking back at data previously collected
  - Case Reports
  - Case Series
- Prospective – make plan for future data collection
  - Observational
  - Interventional
    - Device/technique
    - Drug
Cranial Fasciitis:
Nodular Fasciitis of the Head

Richard J. Barohn, 2d Lt., USAF, M.C., and David L. Kasdon, Major, USAF, M.C.

Department of Neurosurgery, Wilford Hall USAF Medical Center, Lackland Air Force Base, Texas

Lesson: You have to start somewhere.
Autosomal recessive distal dystrophy

Richard J. Barohn, MD; Robert G. Miller, MD; and Robert C. Griggs, MD

Article abstract—We describe five new cases of autosomal recessive distal dystrophy (Miyoshi myopathy) and emphasize the distinctive clinical and laboratory features of this unusual muscular dystrophy. Symptoms began at age 15 to 25, the gastrocnemius muscles were selectively involved, and creatine kinase was elevated more than 10 times normal. The EMG showed abundant brief motor units with numerous fibrillations. Dystrophic features without vacuoles were best seen in the biceps femoris muscle. Asymptomatic creatine kinase elevation was present years prior to the development of weakness. The disorder appears to be inherited in an autosomal recessive pattern. Miyoshi myopathy can be distinguished from other distal muscular dystrophies. We propose a new classification for the distal muscular dystrophies.

NEUROLOGY 1991;41:1365-1370

Lessons: Write up your cases
Network
Find long-distance mentor
Lesson: Listen to your mentor

Chronic Inflammatory Demyelinating Polyradiculoneuropathy

Clinical Characteristics, Course, and Recommendations for Diagnostic Criteria

Richard J. Barohn, MD; John T. Kissel, MD; John R. Warmolts, MD; Jerry R. Mendel, MD

- Over a 10-year period, we followed up 60 patients (35 men and 25 women) with chronic inflammatory demyelinating polyradiculoneuropathy. Diagnosis was based on previously outlined criteria. Patients were treated in a uniform manner and the overwhelming majority, 56 (94.9%) of 59 treated patients, initially responded to immunosuppressive therapy. The time for initial improvement was 1.9 ± 3.6 months while the time to reach a clinical plateau was 6.5 ± 5.4 months. The course was monophasic in 32 patients (53.3%) and relapsing in 20 (46.6%). Despite the initial responsiveness, only 24 (40%) of 60 patients are in partial or complete remission, receiving no medication. Two patients died. We were unable to identify specific clinical or laboratory features at the time of diagnosis that predicted outcome. Our data analysis, along with previous reports, suggests that chronic inflammatory demyelinating polyradiculoneuropathy may be more heterogeneous than previously emphasized. In this light, we have proposed diagnostic criteria that allow for the heterogeneity but at the same time provide for a more consistent approach to better establish the natural history of this condition.

In 1968, Austin described a recurrent, steroid-responsive polyneuropathy in 2 patients and reviewed the findings of 9 additional cases. In 1 case example, Austin was able to demonstrate unequivocal steroid-responsive-ness through documentation of 20 recurrences over a 5-year period compared with significant progression following oral, intramuscular, and intravenous placebo administration. Furthermore, he outlined the salient features of this disorder that include elevated cerebrospinal fluid (CSF) protein levels during bouts of recurrence and electrophysiologic studies demonstrating an admixture of nerve conduction block and partial denervation in association with severe motor unit loss. In one third of the patients, large nerves were described and the presence of interstitial edema was identified. He also recognized the caveats for treatment that included not only the obvious steroid side effects but also the fact that treatment represented a suppression of disease activity and not necessarily a cure. Furthermore, he wisely pointed out that the "anti-inflammatory" or "anti-allergic" effects of the drug-dependent polyneuritis, and "steroid-responsive recurrent polyneuropathy." Many reports emphasize the potential for corticosteroid therapy and other treatments directed at altering an immune-mediated pathogenesis. In fact, from a historical perspective, it is the response to immunosuppressive therapy that has been the single most important factor distinguishing this polyneuropathy from others.

The potential therapeutic implications of this disorder provide compelling reasons to establish diagnostic criteria as well as a precise description of the natural history. The most critical attempt to accomplish these objectives was the review by Dyck et al. in 1975 that referred to this condition as "chronic inflammatory polyradiculoneuropathy." It should also be noted that the more current designation of the disorder as chronic inflammatory demyelinating polyradiculoneuropathy (CIDP) occurred more passively (ie, without additional data presentation) in subsequent reports by Dyck et al. on treatment aspects of the condition. In the 1975 report, Dyck et al.
Observational Research Studies

• Can involve direct participant contact
  - Measure a clinical end-point

• Obtain tissue samples from participant to study in the laboratory

• Can be “data-mining” of clinical databases
  - Never see participant
  - Example: Medicare database
    Electronic medical record
    Nationwide Inpatient Sample
    At KU – HERON I₂B₂ program
Lessons:
- Cases lead to prospective studies
- Have more than one project at a time
- Timing and “luck” are important

**Abstract**  In Duchenne’s muscular dystrophy, functional impairment of smooth muscle in the gastrointestinal tract can cause acute gastric dilatation and intestinal pseudo-obstruction that may be fatal. We describe a patient with this syndrome who at autopsy had smooth-muscle degeneration of the stomach.

To provide objective evidence of functional smooth-muscle impairment in Duchenne’s dystrophy, we performed gastric-emptying studies in 11 patients and 11 normal controls, using technetium-99m radionuclide scintigraphy in a test meal of oatmeal. The patients with Duchenne’s dystrophy had delayed gastric-emptying times (118.18±32.21 minutes [mean ±SEM]) as compared with controls (42.5±3.4 minutes, P<0.01).

The cause of the pathological and functional abnormalities we describe in smooth muscle is unknown but may be a deficiency of dystrophin, the recently identified gene product of the Duchenne’s muscular dystrophy locus. (N Engl J Med 1988; 319:15-8.)

**Figure 2.** Gastric-Emptying Times for 11 Patients with Duchenne’s Muscular Dystrophy (DMD).
## Reliability Testing of the Quantitative MG Score

### Ann NY Acad Sci 1998

#### Lesson:
Put time into measurement tools – it will pay off

<table>
<thead>
<tr>
<th>Test item</th>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>Spontaneous</td>
</tr>
<tr>
<td>Double vision on lateral gaze right or left (circle one), seconds</td>
<td>61</td>
<td>11-60</td>
<td>1-10</td>
<td>Spontaneous</td>
<td></td>
</tr>
<tr>
<td>Ptosis (upward gaze), seconds</td>
<td>61</td>
<td>11-60</td>
<td>1-10</td>
<td>Incomplete</td>
<td></td>
</tr>
<tr>
<td>Facial muscles</td>
<td>Normal lid closure</td>
<td>Complete, weak, some resistance</td>
<td>Complete, without resistance</td>
<td>Incomplete</td>
<td></td>
</tr>
<tr>
<td>Swallowing 4 oz. water (½ cup)</td>
<td>Normal</td>
<td>Minimal coughing or throat clearing</td>
<td>Severe coughing/choking or nasal regurgitation</td>
<td>Cannot swallow (test not attempted)</td>
<td></td>
</tr>
<tr>
<td>Speech after counting aloud from 1 to 50 (onset of dysarthria)</td>
<td>None at 50</td>
<td>Dysarthria at 30-49</td>
<td>Dysarthria at 10-29</td>
<td>Dysarthria at 9</td>
<td></td>
</tr>
<tr>
<td>Right arm outstretched (90 deg sitting), seconds</td>
<td>240</td>
<td>90-239</td>
<td>10-89</td>
<td>0-9</td>
<td></td>
</tr>
<tr>
<td>Left arm outstretched (90 deg sitting), seconds</td>
<td>240</td>
<td>90-239</td>
<td>10-89</td>
<td>0-9</td>
<td></td>
</tr>
<tr>
<td>Vital capacity, % predicted</td>
<td>≥80</td>
<td>65-79</td>
<td>50-64</td>
<td>&lt;50</td>
<td></td>
</tr>
<tr>
<td>Rt-hand grip, kgW</td>
<td>≥45</td>
<td>15-44</td>
<td>5-14</td>
<td>0-4</td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>≥30</td>
<td>10-29</td>
<td>5-9</td>
<td>0-4</td>
<td></td>
</tr>
<tr>
<td>Lt-hand grip, kgW</td>
<td>≥35</td>
<td>15-34</td>
<td>5-14</td>
<td>0-4</td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>≥25</td>
<td>10-24</td>
<td>5-9</td>
<td>0-4</td>
<td></td>
</tr>
<tr>
<td>Head lifted (45 deg supine), seconds</td>
<td>120</td>
<td>30-119</td>
<td>1-29</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Right leg outstretched (45 deg supine), seconds</td>
<td>100</td>
<td>31-99</td>
<td>1-30</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Left leg outstretched (45 deg supine), seconds</td>
<td>100</td>
<td>31-99</td>
<td>1-30</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Total QMG score (range, 0-39)
Consortium for Clinical Investigation of Neurological Channelopathies – CINCH

- Multi-center/International Study
- Funded by NIH and Office of Rare Diseases
- PI – Robert Griggs, MD
- Co-PI – Richard Barohn, MD
- Disorders Studied:
  1. Non-dystrophic Myotonias
  2. Andersen-Tawil Syndrome
  3. Episodic Ataxia
IVR: Interactive Voice Response Diary

- Automated, call in symptom diary
- 1st tier questions
  - Answer yes/no to whether have symptoms: stiffness, pain, weakness, tiredness
- 2nd tier questions
  - If answered “yes” rank severity on 1-9 scale
  - 1 minimal, 9 worst you ever had

Symptom Frequency and Severity

- Data from natural history study
- 76 subjects
  - 25 sodium
  - 27 chloride
  - 5 DM2
- 19 unknown
  - 8 weeks
  - 385 calls to system
  - Stiffness the most frequent symptom 89%
  - Stiffness the most severe


Lesson:
Develop PROMS!

Get Involved Early!
Randomized controlled trial of IVIg in untreated chronic inflammatory demyelinating polyradiculoneuropathy

J.R. Mendell, MD; R.J. Barohn, MD; M.L. Freimer, MD; J.T. Kissel, MD; W. King, RPT; H.N. Nagraja, PhD; R. Rice, PhD; W.W. Campbell, MD; P.D. Donofrio, MD; C.E. Jackson, MD; R.A. Lewis, MD; M. Shy, MD; D.M. Simpson, MD; G.J. Parry, MD; M.H. Rivner, MD; C.A. Thornton, MD; M.B. Bromberg, MD; R. Tandan, MD; Y. Harati, MD; M.J. Giuliani, MD, and the Working Group on Peripheral Neuropathy*

Article abstract—Objective: To determine the efficacy of IV immunoglobulin (IVIg) given patients with untreated chronic inflammatory demyelinating polyradiculoneuropathy (CIDP). Methods: A randomized, double-blind, multicenter, investigator-initiated study compared IVIg (Aventis Behring LLC, King of Prussia, PA) with placebo (5% albumin). On days 1, 2, and 21, IVIg (1 g/kg) or placebo was given. The primary outcome measure was the change in muscle strength from baseline to day 42, using the average muscle score (AMS). Secondary outcome measures included change from baseline AMS at days 10 and 21, the Hughes’ functional disability scale, forced vital capacity (FVC), and nerve conduction studies (NCS) of four motor nerves (median, ulnar, peroneal, and tibial). Results: The patients (n = 33) were randomized. Of these, 30 (14 women, 16 men, aged 54 ± 20 years, range 13 to 82) received IVIg and 23 were given placebo (12 women, 11 men, aged 50 ± 18 years, range 23 to 73). Baseline AMS values of the groups were similar (IVIg 7.06 ± 1.31 versus placebo 7.28 ± 1.18, p = 0.53). There were two dropouts in placebo group and one in the IVIg group. Mean AMS improved at day 42 comparing IVIg with placebo (0.63 versus −0.1, p = 0.006). Improved strength was seen by day 10. The placebo group lost strength over this same interval. In the IVIg, 11 subjects improved by the functional disability scale; none worsened. This differed (p = 0.019) from those in the placebo-treated group (two improved, two got worse, remainder unchanged). Forced vital capacity did not improve with IVIg treatment. IVIg improved ulnar motor distal latency (p = 0.005), tibial distal compound muscle amplitude (p = 0.003), and peroneal nerve conduction velocity (p = 0.03). Conclusions: IVIg improves strength in patients with untreated CIDP by day 10 with continued benefit through day 42; more than one third improve by at least a functional grade on a disability scale. This study provides data supporting IVIg as the initial treatment for CIDP.

NEUROLOGY 2001;56:445-449

Lessons: TEAM EFFORT with mentors
Build on prior pubs
Lessons: Make lemonade out of lemons – publish neg data – use outcome
Some things you have no control over
Mycophenolate Mofetil Rand/Control Trials in MG

- Sanders & colleagues (MSG Neurology 2008;71:394)
  - Investigator initiated funded by FDA-ODG
  - Must be AChR-Ab pos
  - No prior IS Rx
  - 2.5 gm MM vs. plac
  - All placed on pred 20
  - 1º – QMG 3 mos
  - 2º – MMT, MG-ADL
  - AChR-Ab, SFEMG
  - 80 subjects

- Aspreva sponsored-138 subjects (Sanders et al Neurol 2008;71:400)
  - Can already be on prednisone
  - 9 month trial

RESULTS FOR BOTH:
NO SIGNIFICANT DIFFERENCE!
Mycophenolate Mofetil
Rand/Control Trials
Why Negative?

• Drug does not work
• Prednisone improved all pts and masked MM effect
• Studies were not long enough
• Endpoints were not good enough
• Heterozygous populations enrolled
Phase II Therapeutic Trial of Mexiletine in Non-Dystrophic Myotonia

Richard Barohn, Brian Bundy, Yunxia Wang, Laura Herbelin, Jaya Trivedi, Michael Hanna, Dipa Raja Rayan, Shannon Venance, Emma Ciafaloni, Mohammad Salajegheh, Giovanni Meola, Valeria Sansone, Alice Zanolini, Jeffrey Statland, Robert Griggs, CINCH Study Group

Supported by FDA-OPD RO1 FD 003454 & RDCRN/NIH U54 NS059065-05S1

IND #77,021
Mexiletine in NDM

Two-Period Crossover Design

NDM
N = 59

N = 29
Mexiletine 200mg tid
Placebo

Week:
1 2 3 4

Wash-out Period:
6 7 8 9

N = 30
Placebo
Mexiletine 200mg tid

Indicates the weeks to include for the primary endpoint analysis
Interactive Voice Response Diary

- **Primary outcome:**
  - Mexiletine significantly improved stiffness on the IVR

- **Secondary measures**
  - Mexiletine also significantly improved pain, weakness, and tiredness on the IVR

**Lessons:** Rare disease research:
- Can be done
- Can have simple outcome measures
- Use re-purposed drug
- Requires multiple sites
Mexiletine for Symptoms and Signs of Myotonia in Nondystrophic Myotonia
A Randomized Controlled Trial

Mexiletine for Treatment of Myotonia
A Trial Triumph for Rare Disease Networks
Hoffman EP, Kaminski HJ

JAMA 2012;308(13):1357-1365
Spectrum of Translational Research

T1 Translation to Humans
- Pre-clinical & animal studies
- Physiology studies
- Pharmacokinetics
- Proof of concept
- Phase 1 trials
  (First in Humans)
- Focus: Discovery and Safety

T2 Translation to Patients
- Phase 2 & 3 clinical trials
  - Medications
  - Treatments
  - Procedures
  - Behavioral Interventions
- Focus: Safety and Efficacy

T3 Translation to Practice
- Phase 4 clinical trials
  - Focus: Effectiveness
- Health services research
  - implementation
  - dissemination
  - communication
- Focus: Getting the word out and putting into practice

T4 Translation to Populations
- Community studies
- Policy studies
- Population/Outcome studies
- Focus: Improving population health
Drug Trials

Pre-Clinical – Animal and In Vitro Lab Studies

Phase I – Safety (normals & disease)

Phase II – Preliminary Efficacy Data with additional safety
usually < 100 patients

Phase III – Pivotal efficacy trial
Large, often multicenter

Phase IV – Post-marketing
Who Pays for Clinical Research?

• Federal Grants
  Example: National Institutes of Health
  FDA-Orphan Drug Grant Program
  PCORI – Patient Center for Outcomes Research Institute

• Foundations
  Example: Muscular Dystrophy Association, ALSA

• Industry

• Internal-funding at medical center
  Example: Research Institute of KUMC
  CTSA Pilots

• Private Donations

• Non-Funded Research
PCORnet’s goal

PCORnet seeks to improve the nation’s capacity to conduct clinical research by creating a large, highly representative, national patient-centered network that supports more efficient clinical trials and observational studies.
New Directions in Research via PCORI

- PCORI – Patient-centered Outcomes Research Institute
- Greater Plains Consortium – one of 11 newly funded
  - R. Waitman, KUMC, PI
- Link Epic EMR to do comparative effectiveness research
- U Kansas – lead site
  - U Iowa
  - U Neb
  - U Minnesota
  - U Wisc
  - Med Col Wisc
  - Marshfield
  - UTHSCSA
  - UT Southwestern
  - CMH
- $7 million over 18 months
ALS is Rare Disease Demonstration Project for GPC

- All sites use same ALS data forms
- 1st question – what’s best drug for sialorhea?
- Plan – randomize to glycopyrrolate, amitriptyline, scopolamine patch, atropine drops
  - 3 months
  - Ask patients to grade response and side effects
  - Patient Reported Saliva Management Scale (PRSMS)
    - Since beginning the medication, do you feel that the drooling is:
      1. Markedly worse;
      2. Slightly worse;
      3. Not at all different;
      4. Slightly better;
      5. Markedly better.

- QoL – Simmons
- ALS-FRS
- New PCORI grant submitted May 2014
  - Priority score 47
  - Not funded – will resubmit Spring 15
  - Critique not enough involvement of patients in planning study
- 500K/year direct costs x 3 years
Next PCORI Concept

- Study of Drug Combination for Treatment of Amyotrophic Lateral Sclerosis
- Comparative effectiveness study
- Patients want this type of study!
- Multi-CDRN’s (total of 3 or 4 CDRN) – very unique/linking EMR – perhaps 40 sites
- Open to majority of ALS patients
- Conducted as part of clinical visits
- 2 mil/ear direct x 5 years
PAIN-CONTRoLS

Patient-Assisted Investigation of Neuropathic Pain: Comparison of Treatments in Real-Life Situations

Richard J. Barohn - PI
Mazen M. Dimachkie - CO-I
Mamatha Pasnoor - CO-I
Byron Gajewski - CO-I
Omar Jawdat - CO-I
Scott Berry - Consultant
Laura Herbelin - Project Manager

#CER-1306-02496
500K x 3 years
Aims

• Specific Aim 1: Determine which drug is most effective in producing pain relief and improving quality of life in patients with Cryptogenic Sensory Polyneuropathy (CSPN).
  – Perform a prospective randomized comparative effectiveness adaptive design study
  – 4 drugs: nortriptyline, duloxetine, pregabalin and mexiletine

• Specific Aim 2: Determine which drug has fewest and which has the most side effects.
What Types of Grants Should a Junior Clinical Investigator Apply For?

1. **Local Institutional Support**
   - KUMC Research Institute
   - Department
   - CTSA T & K awards & pilots

2. **Disease-Related Foundations**
   - Standard Research Grants
   - Career Development Grants

3. **NIH (NIH.gov)**
   - Apply to NIH for:
     - K23 – Clinical Research
     - K08/K01 – Lab/Translational
     - R03 – Pilot Program
     - R21 – Developmental/Exploratory
   - Institutional Awarded Training Grants:
     - T32 – Training
     - K12 – Career Development

4. **VA: Career Development Awards**
   - Merit Grants

**GOAL: R01**
Who Does Clinical Research?

Team Approach

- Investigator(s)
- Project Manager
- Clinical Research Coordinators
  (Example: nurse, respiratory therapist, RD)
- Clinical Research Evaluator
- Research Assistant
- Biostatistician
- Data Manager/Informatics
- Research Pharmacy
- If laboratory based:
  - Lab research personnel (students, post doctorate, technicians)
- Often multiple sites
My National/International Research Groups

- Muscle Study Group - MSG
- Western ALS - WALS
- Northeast ALS – NEALS
- Consortium for the Investigation of Neurologic Channelopathies - CINCH
- NeuroNEXT
- RRNMF
- Peripheral Nerve Society
- Myasthenia Gravis Foundation of America
- GBS/CIDP Foundation
- Muscular Dystrophy Association – MDA
- ALS Association
> 800 Neuromuscular Health Care Professionals
Steps to Clinical & Translational Research

- Come up with idea! Talk to mentors/colleagues
- Assemble a team to do the research
- Talk to T1 researchers regarding idea
- Write down protocol/grant
- Submit to HSC → get help (use RI)
- Find space/equipment
- Recruit & enroll participants
- Complete study
- Write the results
- Let participants know results
- Come up with another idea – T3 – to see if intervention has changed practice/outcomes
- Start again

**Goal:** Improve health of patients and the population
More Advice from RB

• Get your name out there
• Present abstracts at many meetings, and more than one
• Academic networking leads to pharma recognition
• Don’t work in isolation
• Be a site in multi-center trials
  – Started by academics
  – Started by pharma
  – Don’t be selective initially
• Become affiliated with patient groups in your area
• Lecture at national meetings – academic and patient groups
Write, Write, Write!

• Grant reviewers need to know who you are
• Abstracts – lead to papers
• Case reports
• Scales/methods
• Early results
• Negative data
• Pivotal papers
• Use 1\textsuperscript{st}, 2\textsuperscript{nd}, 3\textsuperscript{rd} tier and “fringe” journals
• Review articles – even early
• Book chapters – not too much
• Books??
• ??? Open access
  – Good and bad
What are you good at?
What are you not good at?

• Figure out what you are good at/have talent for, and keep doing it, over and over

• Figure out what you are not good at, and don’t do it – get help if you still need it

• If I can do this, you can….. If you want to
Pathways To Discovery

• Traditional
  – Wet Lab
  – Clinical
• Data Mining
• Quality Improvement
• Simulation
• Entrepreneurship
KU Innovation and Collaboration (KUIC) is the commercialization arm of the University of Kansas (all campuses):

- Intellectual property (IP)
- Corporate partnerships
- Industry Sponsored Research Agreements
  
  *Not affiliated with clinical trials*
  
  - Entrepreneurship

www.kuic.ku.edu

**KU Medical Center:**
2002 W. 39th Ave., Kansas City KS 66103
Phone: (913) 588-5721; Fax: (913) 588-8214

**Lawrence Campus:**
2029 Becker Drive, Suite 142, Lawrence, KS 66045
Tel: (785) 864-6401; Fax: (785) 864-5272

Julie Nagel, Interim Assoc. Vice Chancellor Innovation & Entrepreneurship, jrnagel@ku.edu
Rajiv Kulkarni, Director, rkulkarni@ku.edu
Collab

• A KU medical student-led group focused on entrepreneurship.

• Collab sponsors events where researchers on campus can connect with entrepreneurial students and other innovators.
  – Collab BREW: Campus innovation forum: Every first Tuesday, features demos, discussion and connection with community.

  • Contact Collab: collab@kumc.edu
    Maria Iliakova, medical student: miliakova@kumc.edu, 816-223-0260
  • Visit Collab online:
    www.wecollab.org
  • Facebook: www.facebook.com/groups/collab2014
  • Twitter: www.twitter.com/collabKU
Reverse Pitch Event

• Sponsored by Collab, Sprint Accelerator, Techstars and KU Medical Center.

• KU Medical Center doctors presented problems and issues to entrepreneurs who attempted to help find solutions.

• Dr. Barohn reverse pitched his “Rick’s Real Neuromuscular Friends” website on Oct. 8.
The New Discovery Vocab

- Translational research
- Team science
- PCORI/PROMS
  - Patient Centered
- Informatics/Big Data
  - $I_2B_2$
- Community engagement
- Personalized medicine
- Open access
- Intellectual Property
- Entrepreneur/entrepreneurialship
- Start Ups
- Venture Capital
Motives For Discovery

• Improve Health and Humanity
  – Improve health care team performance
  – Improve patient care outcomes

• Seek New Knowledge
  – Publish

• Patents

• Money
  – Grants
  – Business
  – Job

• Power – Access
  – Narcissism/Ego
  – Fame
Edward O. Wilson
TWO-TIME PULITZER PRIZE-WINNING AUTHOR
NATURALIST

“A pleasure to read and reread....One of the finest scientific memoirs ever written, by one of the finest scientists writing today.”
—Los Angeles Times Book Review
The purpose of this letter is to help orient you among your colleagues.

Principles:

1. It is far easier to acquire needed collaboration from mathematicians and statisticians than it is for mathematicians and statisticians to find scientists able to make use of their equations.

   My interpretation:
   - It all starts with an idea and that’s the job of the investigator
   - Scientific investigation is done by a team
   - Statisticians are a key member of the team
   - Clinical researchers really are important

2. For every scientist, whether researcher, technician, or teacher of whatever competence in mathematics, there exists a discipline in science for which that level of mathematical competence is enough to achieve excellence.

   My interpretation:
   - You don’t have to be an expert at everything
   - Find out what you are good at and do it over and over and over
   - Find out what you are not good at and don’t do it
“Letters to a Young Scientist” cont.

3. March away from the sound of guns. Observe the fray from a distance and while you are at it, consider making your own fray.

   – *My interpretation:*
     * You don’t have to be part of the established elite to make a contribution*
     * Make your own elite group*
     * Listen to your mentors but eventually forge your own path*
     * Look for new opportunities in new places*

4. In the search for scientific discoveries, every problem is an opportunity. The more difficult the problem, the greater the likely importance of its solution.

   – *My interpretation:*
     * Opportunities arise from patient care*
     * Think a lot about the cases you see and come up with new questions*
     * Be ready for all opportunities*
Final Words of Advice for Success in Clinical and Translational Research

- Use all available resources
- Find a mentor, or two, or three
- Network – locally, nationally, internationally
- Be Flexible/opportunistic
- Have 3 to 4 projects in various stages
  - Don’t wait for the “big one”!
  - Don’t focus too narrow
- Speed is important in clinical trials
  - Regulatory speed
  - Recruitment speed
  - Writing speed
- Persistence – DON’T GIVE UP