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Clinical Research in Ophthalmology: Developing a Career as a Physician Scientist

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The Complex Nature of the Problem

“Physician-scientists are catalysts of translational research. With one foot in the practice of medicine and the other in research and discovery, they are uniquely positioned to bridge the gap between laboratory and bedside. In so doing, they enhance patient care, improve medical education, and increase the prosperity of the biomedical enterprise.

Although science has never been more accessible and directly applicable to human health, there is a paradoxical scarcity of physician-scientists.

Causes of this shortage include prolonged training and the associated debt-load, the corporatization of medicine, inadequate research funding, and the complexity of a dual career.”

The Complex Nature of the Problem

Now that we are in the post-genomic era, there is a greater need than ever for the continued participation of [physician scientists] because of their unique ability to bridge the "bench to bedside." However, the number of physicians pursuing this career is static and their average age is rising.

Recent data indicate that the many benefits of this career path are seen as being outweighed by many negative factors […].

We have identified the lack of professional security as a major factor that prompts young physicians to abandon the physician-scientist track.”

Why Consider a Physician-Scientist Career?

- The Physician/Clinician Scientist is a seriously “endangered species” across all subspecialties
  - A PubMed search 1991 to present yielded 93 papers specifically dedicated to discussing the role and declining number of physician scientists
    - Physician scientist PubMed Results.webarchive
    - http://www.ncbi.nlm.nih.gov/sites/entrez?cmd=HistorySearch&query_key=8&WebEnv=0bCy8DBM5aZu1NE3n92Ut6rXTCcx6g4iP07DEvLryxGJG28Kmutx1E8i8VXkRPPGi7_6243wQctWfu%40264631926FE4CB10_0104SID&WebEnvRq=1&db=pubmed
    - http://www.ncbi.nlm.nih.gov/entrez/login.fcgi?call=0NTQw95KEIM-1pLA3kA7v3&callpath=0YqEtpzfUduGR0ZP-6yKV2TOGfq0Hst1DnRE
Why Consider a Physician-Scientist Career?

- The problem of the shortage of Physician Scientists, and the awareness of it, has increased dramatically over the years in the medical community.
Why Consider a Physician-Scientist Career?

- **Rewards**
  - **Academic career**
    - Stimulating and challenging
  - **Accomplishment**
  - **Leaders vs. followers**
    - Opportunity to shape the way care is delivered, how science progresses, and how research is funded
  - **Peers’ recognition nationally and internationally**

- **Advantages**
  - Greater control over one’s time and selection of activities
  - Lower clinical/surgical burden
  - Diversification of one’s professional portfolio
Training Physician Scientists: The Principles Behind It

- Duke University modified their Med School curriculum a few decades ago to meet this visionary need
  - Inquire, not just acquire
  - Flexibility of choice
  - In-depth exploration

Developing (into) Physician Scientists: How?

- Universities have to create opportunity, infrastructure, incentives, and a campus-wide mentality that favors the development of physician scientists. However...

- ... that of the physician scientist is a “species”
  - While having the opportunity to develop into physician scientists is key, no one can create physician scientists

- The development of physicians scientists is first and foremost a process of “nurturing the nature”
  - The nurture:
    - Opportunity, infrastructure, incentives, campus-wide mentality
  - The nature:
    - The doctor (or future doctor) has to have some degree of a spontaneous “physician scientist flame” burning inside

    - If the flame is extinguished by “lack of nurture”, concern about the present, uncertainty about the future, the nature can be repressed and, ultimately, lost
An example of opportunities and infrastructure nurturing early the nature of medical students is the NIH-sponsored Medical Student Research Fellowship program (MSRF) administered locally by Universities.

- UTHSC has a rather successful one:
  - Med students are eligible to apply for these summer or off-quarters’ fellowships.
  - Up to 24 fellowships are awarded each year.
  - Deadline for summer fellowships’ applications is March 31.
  - [http://www.utmem.edu/research/edu-training/MSRF/](http://www.utmem.edu/research/edu-training/MSRF/)
  - Point of contact: Stephen C. Tom, Director of Research (Tel: 901-448-5528 or Email: stom@utmem.edu)

Developing (into) Physician Scientists: How?

Other Opportunities via the NIH

- **F31 Individual NRSA Predoctoral Fellowships**
  - Up to 5 years of support of full-time research (e.g., to obtain a Ph.D.) to minority students, candidates from disadvantaged backgrounds or with disabilities

- **Clinical Research Training Program (CRTP) at NEI**
  - One-year program at NEI for M3 students
  - Provides stipend of $25,300/year plus housing, travel, FAES courses, health insurance, and some relocation costs
Developing (into) Physician Scientists: How?

**Other Opportunities: Private Agencies & Foundations**

- **Howard Hughes Medical Institute (HHMI) programs**
  - Research Training Fellowships for Medical Students
    - One-year full-time research training at any institution but NIH
    - Annual stipend of $27,000, annual fellow’s allowance of $5,500, and annual research allowance of $5,500
    - Deadline for application: January 11, 2008
      - [http://www.hhmi.org/grants/individuals/medfellows.html](http://www.hhmi.org/grants/individuals/medfellows.html)
  - HHMI/NIH Research Scholar Program (a.k.a. Cloister Program)
    - Similar to above but to be done at NIH (Bethesda, MD)

- Research to Prevent Blindness
- Fight for Sight
Developing (into) Physician Scientists: How?

Other Opportunities: Private Agencies & Foundations (cont’d)

- Howard Hughes Medical Institute (HHMI) programs
- Research to Prevent Blindness
  - Medical Student Fellowships
    - One-year, full-time research program open to M1 or M2 students
      - Candidates have to be nominated by Chairs of Departments of Ophthalmology that receive support from RPB (Unrestricted or Challenge Grants)
      - [http://www.rpbusa.org/grants_categories.htm](http://www.rpbusa.org/grants_categories.htm)
- Fight for Sight
  - Medical Student Summer Research Fellowship
    - Specific areas of research interest are set forth by the agency
      - For 2008:
        - Retinitis pigmentosa and hereditary eye diseases
        - Age-related macular degeneration
        - Glaucoma
        - Cataract and corneal disease
        - Neuro-ophthalmology
        - Children’s vision disorders
Developing (into) Physician Scientists: How?

- What if one has already graduated from Med School and/or has already entered (or finished) a residency program?
  - Pursue one (or two) research-oriented “post-doctoral” fellowship opportunities
    - Identify your field of interest (your “niche”)
    - Identify leaders in your field of interest
    - Training at top-notch institutions helps build “pedigree” and likelihood of success finding a position and developing into a successful independent investigator later
  - Find funding opportunities to support your career development objectives
    - National Institutes of Health (NIH)
    - Private Agencies and Foundations
    - Howard Hughes Medical Institute (HHMI)
Developing (into) Physician Scientists: How?

- National Institutes of Health (NIH)
  - NIH-sponsored Loan Repayment Program (LRP)
  - NIH-sponsored Fellowships
    - National Research Service Award (NRSA) Fellowships
    - Clinical Research Training Program (CRTP) at NEI
  - NIH-sponsored 5-year “K-Awards”

- Other Governmental Agencies
  - Military Funds (DOD, Army)
  - Oak Ridge National Research Laboratories
    - Close partnership with UT

- Private Agencies and Foundations
Developing (into) Physician Scientists: How?

- National Institutes of Health (NIH)
  - NIH-sponsored Loan Repayment Program (LRP)
    - Requires a 50% (=20 hr/wk) commitment to conducting mentored research for 2 years
    - Short application (20,000 characters = 5-6 pages w/ references)
    - Repays up to $70,000 of eligible student loans
    - Does not provide salary/stipend
    - An alternative funding source to support salary is needed (and accepted) when applying for an LRP
      - One can have a K Award and apply for an LRP grant at the same time
      - LRP Help Desk contact no: 866-849-4047
  - NIH-sponsored fellowships
  - NIH-sponsored 5-year “K-Awards”
Developing (into) Physician Scientists: How?

- NIH-sponsored Loan Repayment Program (LRP) - cont’d
Developing (into) Physician Scientists: How?

- NIH-sponsored Loan Repayment Program (LRP) - cont’d
Developing (into) Physician Scientists: How?

- **National Institutes of Health (NIH)**
  - NIH-sponsored Loan Repayment Program (LRP)
  - NIH-sponsored National Research Service Award Fellowships
    - [http://grants.nih.gov/training/F_files_nrsa.htm](http://grants.nih.gov/training/F_files_nrsa.htm)
    - **F32 Individual NRSA Postdoctoral Fellowships**
      - Full-time mentored research period of 2-3 years
        - [http://grants.nih.gov/training/nrsa.htm](http://grants.nih.gov/training/nrsa.htm)
  - NIH-sponsored 5-year “K-Awards”
Developing (into) Physician Scientists: How?

- NIH-sponsored fellowships (cont’d)

NRSA Fellowships and Training Grants (F & T Awards) for Individuals With or Earning a Research Doctorate
Developing (into) Physician Scientists: How?

- **National Institutes of Health (NIH)**
  - NIH-sponsored Loan Repayment Program (LRP)
  - NIH-sponsored fellowships
  - NIH-sponsored 5-year “K-Awards”
    - Formal training (e.g., M.S. or Ph.D.) under these awards possible
    - Career Transition Awards (K22)
    - Pathway to Independence Awards (K99)
    - Laboratory Research (K08) – ≥75% research effort
    - Patient-Oriented Research (K23) – ≥75% research effort
    - “Institutional” K-Award (K12) – ≥75% research effort
      - K Award “offered” by the institution to internal or external applicants on pre-determined areas of research (can be either K08- or K23-type)
      - The junior faculty candidate operates in the capacity of a “super-postdoctoral fellow” for 5 years to be groomed towards an independent career (elsewhere)
        - [http://grants.nih.gov/training/careerdevelopmentawards.htm](http://grants.nih.gov/training/careerdevelopmentawards.htm)
Developing (into) Physician Scientists: How?

**Private Agencies & Foundations**

- **Research to Prevent Blindness**
  - Candidates have to be nominated by Chairs of Departments of Ophthalmology that receive support from RPB (Unrestricted or Challenge Grants)

- **Knights Templar Eye Foundation**

- **Fight for Sight**

- **Prevent Blindness America**

- **American Federation for Aging Research**
  - Beeson Career Development Awards jointly with NIH (K08 or K23 mechanism)

- **American Health Assistance Foundation**
  - AMD and glaucoma research only

- **International Retinal Research Foundation**
  - Retinal diseases only (mainly AMD and diabetic retinopathy)

- **Foundation Fighting Blindness**
  - Hereditary retinal diseases and dry AMD research only
Developing (into) Physician Scientists: How?

- Private Agencies & Foundations (cont’d)
  - Burroughs Wellcome Fund Clinical Scientist Awards in Translational Research
    - 5-year, $750,000 Awards for relatively early-stage career faculty
      - Emphasis on novel ideas and approaches
      - Candidates have to be nominated by the applying institution (limited number)
      - Deadline for application: Early to mid Fall of each year
        - [http://www.bwfund.org/programs/translational/clinical_scientists_apply.html](http://www.bwfund.org/programs/translational/clinical_scientists_apply.html)
  - HHMI Physician-Scientist Early Career Award
    - 5-year, $375,000 Awards
    - Can apply while at the end of training or first 2 years of faculty appointment
      - Only previous HHMI Award recipients eligible to receive these Awards
      - Deadline for application: Early March of each year
        - [http://www.hhmi.org/grants/individuals/earlycareer.html](http://www.hhmi.org/grants/individuals/earlycareer.html)
Thanks!

Q & A