A CLINICAL STUDENT’S PERSPECTIVE: FINDING A ROLE FOR AN MD PHD IN THE CLINICS

Ahmara Gibbons, PhD MS4
“Physician-scientists have always brought a unique perspective to biomedical research...inspired by their personal experiences caring for patients”

Role= being a constructive, outspoken, catalyst for change at your institution (research, clinical care, and teaching)

This dual role is swiftly vanishing: at every point in the early life cycle of NIH funding, physician-scientist are more likely than PhD scientist to leave the NIH applicant pool

- 40% of MDs with K08 awards don’t even apply for independent R01
- MD with R01 awards are less likely than PhDs to apply for a subsequent grants
Fighting against the pull to 100% clinical-private practice

- Be **proactive** about carving out a physician-scientist career path
- **Seek and cultivate mentors** that are pursuing the same path
- Learn **self-discipline** and **time management skills**
- Learn that medical research today is a **team sport**
  - This will become important in the clinic as well
  - You will have to balance clinical responsibilities of a resident with personal research responsibilities
- Look for science in even the most straightforward medical cases...
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Case Study: “I have a HA”

- **HPI**: A 55 year old male presented to the CCHS ED c/o constant 7/10 achy constant headache that has been steady increasing in intensity for 3 months.
- He presented to the ED because the constant headache began to wake him up from sleep and slowly became associated with loss of continence (urinary/fecal); he also c/o intermittent bone pain in the knee.
- **PSurgHx**: no surgeries
- **Meds**: no medications
- **Social**: no drugs, social drinker, and 45 pack year
- **MedHx**: no significant medical history
- **Allergies**: NKDA; **FamHx**: father died of CRC at age 78
- Friends and family also noted a change in behavior over the past 2 months
- **PE**: left sided papilledma, CN V defect with sparing of the forehead, decrease in rectal tone and reactivity, 3/5 RUE and RLE power, and reflexes intact B/L
- During his hospital stay he was angry however, easily re-directable, impulsive and made multiple attempts to elope from the hospital AMA
- **In the ED**: IM dexatron, MRI, a CXR, FBS (-), and a testicular exam
- **HD #2**: Neurosurgery debulked the tumor; Path positive for lung adenocarcinoma
Interesting Patient to Case Report

- It is a common finding for a patient to present with CXR negative lung cancer
  - Sensitivity of CXR
  - Sensitivity of CT Scans of the lung

- Are there more specific findings and diagnostic tools to evaluate for suspected or r/u Lung cancer?
  - Reports from secondary care show that some patients with normal chest X-rays transpire to have lung cancer
    - CT Scan is not much better- skill of the imager and reader

- Ophthalmologic and History tends to be a better indicator at predicting presence of disease
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Inflicted Childhood Neurotrauma

- Inflicted neurotrauma is the **most important type** of injury in infants resulting from child abuse.
- Inflicted pediatric neurotrauma is the leading cause of death from traumatic brain injury in children younger than 2 years of age.
- More than 3000 children younger than 1 y.o.a are victims of severe or fatal inflicted neurotrauma.
- Number of mild cases may be over 100 times higher.
- Incidence of inflicted childhood neurotrauma is greater than cystic fibrosis or ALL.
Diagnosis of child abuse: A Clinical Diagnosis

- History: clinical signs and symptoms are incompatible with caregiver history
  - 2 month old baby girl in the ER with scalp swelling
  - 4 month old baby with a rule out PCN
  - 4 year old with genital herpes or Chlamydia
Diagnosis of child abuse: A Clinical Diagnosis

- Inflicted neurotrauma is a type of child abuse
  - Shaken Baby syndrome is a clinical diagnosis of a type of inflicted neurotrauma
  - Characterized by retinal hemorrhages in 85% of the cases
  - This is a clinical or often pathological diagnosis
Pathophysiology of Retinal Hemorrhages in SBS

- Only 2/3 of SBS present with retinal hemorrhages: bilateral, subretinal hemorrhages (classic)
  - Pre-retinal space that extends to the ora serrata and NFL
- Repeated acceleration-deceleration movement of the eye
  - Disruption of vitreo-retinal attachments leads to retinal vessel damage
  - This leads to leaky vessels and cranial nerves that carry autonomic supply to retina

**Hypothesis:** Markers of retinal vascular dysregulation and injury in vitreous can be used to identify iTBI in pediatric populations
Marker of Vascular Trauma in Pediatric Populations

- **Controls** = children deceased from natural causes, vitreous samples from children with vitrectomy from cataract surgery
- **Traumatic Brain Injury** = automobile accidents
- **Inflicted Brain Injury** = confirmed inflicted by state coroner (PA)
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A Clinical Student’s Perspective: Finding a Role for an MD PhD in the clinics

Heather Cohn, MD PhD
How to keep research in your life

• Case studies
• Post-doctoral fellowships & grant writing
• Book chapters and review articles
• Advanced Basic Science rotation
• Away elective rotations
Superior Vena Cava Syndrome
Dissection with pseudoaneurysm presents as an acute internal carotid artery stroke post-carotid endarterectomy.

Figure 3: CT Angiogram of the neck

There is a dissection of the L CCA, with dilated false lumen and pseudoaneurysmal dilatation and resultant obstruction of the true lumen. No antegrade flow is seen intracranially from the L ICA.
Puzzling persistent papules

A middle-aged man presents with a persistent malodorous papular condition. Could it be genetic?

CASE HISTORY
A 55-YEAR-OLD man construction worker with a 15-year history of persistent, yellow-brown, papular lesions on his forehead, scalp, nape, and neck. The lesions first appeared during puberty, relapsing and remitting over the following 35 years. He presented after a recent holiday, during which he described feeling actually isolated due to the persistent odor that accompanied his lesions. He had been applying anti-odor cream to four times a day with little improvement.

His history revealed his father had similar lesions, a few newer lesions that were a brown, crumbly-like rash on his neck and chest.

EXAMINATION
This patient had multiple brown to black papules, roughly the size of a pinhead, and a thicker, noticeable verrucous papule on his right ear (Figures 1 and 2).

Keratocyte papules: 1 to 2 mm in diameter are observed on the patient's chest, back, and scalp. Other features include a white to yellow discoloration and white linear bands on his nails with distal yellowing (Figures 3 and 4).

The result of a biopsy taken from the patient's chest showed epidermolysis with acantholytic keratinocytes. Laminar, corneal, and dermal papules were found in the granular layer and abnormally elongated dermal papillae were present.

DIAGNOSIS
Dietel's disease.

**Histological diagnosis of Dietzel's disease:**
- Transient acantholytic dermatosis
- Halley-Halpern disease
- Pemphigus foliaceus
- Scleroderma: dermatitis
- Erythema chronicum migrans
- Groove disease


discussion
Dietzel's disease, also known as keratolysis follicularis, is an autosomal dominant disorder first described in 1899.1 Located on chromosome 12p22-23, mutations in the ATP2A2 gene are recognized as the molecular defect.2

This region of the human genome encodes the sarcoplasmic reticulum calcium adenosine triphosphatase type 2 isomorph pump (SERCA2), and haplo-type insufficiency of this critical calcium transport pump results in demaggregation of keratinocyte calcium homeostasis.3

Interestingly, several congenital disorders (including epidermolytic hyperkeratosis, Dieter's disease, and mental retardation) may be involved because of a potential non-sense mutation near the SERCA2 gene.4

Clinical presentation of Dietzel's disease can be quite variable. At first, patients may notice itchy, red areas on their skin, followed by SCC growth.5

Management and treatment are typically asymptomatic. Patients may benefit from regular moisturizing and avoid exposure to sunlight and UV light.6

Symptoms typically resolve, but the condition may recur. Treatment options include topical steroids and phototherapy.7

Finally, consider referring the patient to a genetic counselor. Information on the inheritance pattern and weak genotype-phenotype correlation can facilitate informed decision making.

References are available at www.mdobserver.com.au
# Post-doctoral fellowships & Grant writing

**Current Rotation Schedule 2008-2010**

*modified from Jefferson’s Clinical Curriculum Planner

Please note - exact dates and rotations are only accurate for 2008

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<td>Ob/Gyn</td>
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**Pre-Clerkship Clinical Fresher Course**

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<td>Advanced Basic Science</td>
<td>Dermatology - Dr Uitto</td>
<td>Neurology and Rehabilitation Medicine</td>
<td>Inpatient Subinternship</td>
<td>Outpatient Subinternship</td>
<td>Emergency Medicine/Advanced Clinical Skills</td>
<td>Prepare to Move to Residency</td>
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Prepare to Move to Residency
HICohn Rotation Schedule 2008-2011*
*modified from Jefferson’s Clinical Curriculum Planner
Please note - exact dates and rotations are only accurate for 2008-10

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**Postdoctoral Fellowship in Dermatology at University of New South Wales.**
Collaboration with Profs Uitto (JMC) and Murrell (UNSW) studying genetics risk factors in skin cancer, specifically young patient’s with recessive dystrophic epidermolysis bullosa.
Taught high school biology students in Sydney’s Inner West at Pre-Uni New College. Sept 09 - Jan 10.
Awarded Sir Keith Murdoch Fellowship, American Australian Association. Jan 2010
Met with Dr Uitto

- Sydney
  Location of University of New South Wales
Meet with Dr Rattner
Write Curriculum Committee
Meet with Janice Bogen
Contact UNSW
Email Prof Murrell
Contact International Student Education Program
Apply for Fulbright Scholarship
Email Fulbright Committee
Apply for Foerderer Fellowship
Awarded Foerderer Fellowship
Apply for Australian VISA
Flight Confirmation and Pack
In a scientific collaboration with Profs DF Murrell and J Uitto, this project aims to study the guanine -1607 MMP1 promoter SNP in a large cohort of EB patients and correlate it with their disease severity.

Other select MMP SNPs with reported functional differences in promoter activity will also be characterized with regards to EB type since multiple mutations may be implicated in the alterations seen in EB patients.
Laryngo-onycho-cutaneous syndrome.
Cohn HI, Murrell DF.
PMID: 19945620 [PubMed - indexed for MEDLINE]

GPCR signalling in hypertension: role of GRKs.
Harris DM, Cohn HI, Pesant S, Eckhart AD.
PMID: 18593382 [PubMed - indexed for MEDLINE]
**Advanced Basic Science elective in Dermatology with Dr Uitto:**  
Course Date Range August 30 – Sept 24

### September

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<th>Sunday</th>
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- **30**: The RDEB & SCC project initiated in Sydney with Prof Murrell continues in the US
- **31**: ABS Course Begins!
- **1**: PCR, HPLC analysis, ethics submissions for RDEB and SCC risk project
- **2**: Continue PCR, HPLC analysis, ethics submissions, possibly NIH & DebRA grant applications
- **3**: Last day of ABS
- **4**: Leave Philadelphia
- **5**: Arrive in Helsinki
- **6**: Visit Prof Ranki and colleagues at U. of Helsinki
- **7**: Leave Helsinki
- **8**: Arrive in Philadelphia
- **9**: PCR, HPLC analysis, ethics submissions, possibly NIH & DebRA grant applications
- **10**: Last day of ABS
- **11**: Leave Philadelphia
ABS in Philadelphia – Goals & Objectives

- Study over 400 DNA samples for single-nucleotide polymorphisms implicated in cancer progression and metastasis from patients with RDEB
- Work with Dr Li on our HPLC analysis at Jefferson with the samples and PCR products from Australia
- Submit IRB / human ethics paperwork for our SNP Cancer Panel project
- Resubmit our DebRA grant application with an updated preliminary results section
- To consider submitting an NIH grant on our project for better financial support
- Fly with Dr Uitto and his colleagues to Helsinki for the #1 European research conference in dermatology – the ESDR
- Present our Jefferson – University of New South Wales collaboration to Prof Ranki and the dermatologist at University of Helsinki
- Continue the ABS project in Philadelphia
- At the completion of my 4 week elective, end with an ABS presentation discussing our collaboration & results to the Jefferson Dermatology Dept
ESDR 40th Annual Meeting in Helsinki – Schedule Highlights

Monday, Sept 6th
• Visit Dept of Dermatology and Allergic Diseases & Helsinki University Hospital
• Participate in the weekly PhD Graduate School meeting & seminars at Biomedicum

Tuesday, Sept 7th
• Learn about the molecular and functional genomic studies at the Skin cancer & Cutaneous lymphoma research unit

Wednesday, Sept 8th
• 12.00 Present postdoctoral project titled “Modifier genes of squamous cell carcinoma risk in patients with recessive dystrophic epidermolysis bullosa” to Skin and allergy hospital & other dermatology units in Finland via videoconferencing

Thursday, Sept 9th
• 07.00-19.00 Registration & 14.00 ESDR 2010 Welcome Ceremony

Friday, Sept 10th
• 08.00-08.15 Search for molecular pathway targets in Subcutaneous panniculitis like T-cell lymphoma - Annamarie Ranki
• 17.20-17.25 SID/ESDR Collegiality Awards Presentation

Saturday, Sept 11th
• 12.00-13.00 Plenary Session 4 - First double-blind randomized clinical trial of intradermal allogeneic fibroblast therapy for severe generalized recessive dystrophic epidermolysis bullosa randomized against placebo injections resulted in similar wound healing that is independent of collagen VII expression - Heather Irina Cohn
Attending the 40th Annual ESDR meeting as an SID/ESDR Young Fellow Collegiality Award Recipient

To go to Helsinki I needed to get financial support from a:

**ESDR/SID Young Fellow Collegiality Travel Award**

With this award, the ESDR waives the registration fee and provides a travel grant of $1,500 to assist with travel and accommodation expenses!

**Requirements:** “Either en route to the ESDR Meeting or immediately after, the award recipient must visit a dept or institute at which the individual could present some data and experience academic discussions/feedback (as well as local hospitality).”

Prof. Annamari Ranki
KLL/Iho- ja sukupuolitautien klinikka,
Iho- ja allergiasairaala Meilahdentie 2,
PL 160, 00029 HUS
Puh. (09) 471 86300, annamari.ranki@hus.fi

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One of the brightest experts in the field of cutaneous T-cell lymphoma!!
Away elective rotations

- Janice Bogen – International Medicine Society (IMS) at Jefferson
The **Medical Student** as part of the team

- Moving from being an expert in your field to being the lowest person on the “medical totem pole”
- List of top ten things I WISH an upper years told me before getting into clerkships
  - You know a lot more than you think you do..
  - You will never know enough..keep reading (this is universal)
  - 3rd year clerkship will RARELY be about “saving a life” or even “doing stuff-procedures”
    - If you perfect you history taking, PE, and read A LOT, you might
Role of the Medical Student

Top ten list continued

- The more you LEARN the more you do..this is true for surgery
- Find a learning point in every patient, and be ready to present it (journal articles in your pocket)
- LEARN QUICKLY how to be a team player
  - But also know how to stand out (this is where those journal articles come into place)
- You are no longer your own boss (there could be a lot of ideal time)
- No one cares about the non-clinical projects you are obligated to do!!! NO complaining
- Find a way to have a good time!!!