FROM THE PRESIDENT

First, I would like to give a big thank you to everyone who participated in this year’s Annual Networking Luncheon at the SNMMI Annual Meeting in Miami Beach, FL! We had a wonderful turnout and are looking forward to seeing many more faces at next year’s meeting in Vancouver. For those who were unable to attend, I would like to review the key points that were presented by our distinguished guest speakers.

Simin Dadparvar MD, ACNM board member and mentor for the NMRO, spoke about the importance of research publication for our CVs and reminded us that monetary awards and travel grants are available for winning abstract submissions during the upcoming SNMMI Mid-Winter/ACNM Annual Meeting in January 2013 in New Orleans. Through NMRO, abstracts can be fast-tracked for publication in the Journal of Clinical Nuclear Medicine. We will be featuring a lot of information regarding research in the coming months, so stay tuned!

Warren Janowitz, MD, ACNM president, spoke about the history of ACNM and the voice that they give to nuclear medicine physicians in SNMMI and in government relations. Dr. Janowitz also discussed the Education and Research Foundation for SNMMI, which provides monetary endorsements to support nuclear medicine research and education. Richard Noto MD, secretary/treasurer of SNMMI, highlighted the many accomplishments of the SNMMI in past years, including the recent name change to SNMMI, the Society of Nuclear Medicine and Molecular Imaging. Dr. Noto explained that SNMMI will be expanding its international membership, collaborating with other organizations, and developing a 2020 Task Force which will include an evaluation of dual certification specialists.

Christopher Palestro, MD, chair of the NM-RRC for the ACGME, explained his role in making sure that other residency programs do not intrude on nuclear medicine residency requirements. He encouraged all residents to review the ACGME website as a group effort to protect our specialty.

Finally, David Brandon, MD, chair of the SNMMI Young Professionals Committee (YPC), explained that the YPC represents scientists and radiopharmacists in addition to physicians, and that they have representatives on almost every committee in SNMMI. We in the NMRO look forward to expanding our relationship with the YPC in the coming months.

Next, I would like to encourage all members to be active participants within the NMRO! This is an organization developed for us, by us. We will be asking for your help in developing our board review question bank, sharing interesting cases for our Facebook page, and developing a new and improved career search center. I would also like to remind you that the NMRO is the voice of our residents! If you have ideas, thoughts, questions or concerns, kindly direct them to me or one of the executive board members (my personal email: ericajill@gmail.com). We will be sure that your request or inquiry is forwarded to the appropriate person, and I will be happy to share these topics of interest with the ACNM board at our semi-annual and annual meetings. Finally, I would like to thank the NMRO board and the general membership for putting your faith in me as the president for this upcoming year. This organization holds an important place in my heart, and I will do everything in my power to make this the best year yet.

Most sincerely,

Erica Cohen, DO, MPH, NMRO President

Call for Abstracts— 2013 Annual Meeting

The Program Committee of the American College of Nuclear Medicine invites the submission of original abstracts for the Annual Meeting, held in conjunction with the Mid-Winter Meeting, January 24-27, 2013 in New Orleans, LA. Papers on all aspects of clinical and basic science in nuclear medicine, correlative imaging in radiology, nuclear cardiology and radiation oncology will be considered. The accepted presentations will be in oral and poster format.

A panel of physicians will judge the young investigator’s posters, and the authors of the best submissions will be presented with their awards during a special banquet on Thursday evening. The presenter must be in attendance at the meeting to be eligible for an award. There will be three Best Assay Awards, each for $500 and two Travel Grants each for $750.

Abstracts must be submitted via e-mail to Anthony Gary at agary@snmmi.org. The author’s names’ and affiliations should be included with the title of the abstract.

For more information regarding the abstract submission guidelines and submission form, please visit the ACNM website at www.acnmonline.org

Submission Deadline: November 15, 2012
History Corner: World War II and Nuclear Medicine

Erica Cohen, DO, MPH

Enrico Fermi, a Nobel Prize–winning Italian physicist, fled to the United States during World War II. It was here that he developed the first sustained nuclear reaction. The first reactor developed for production of an atomic bomb was built at the University of Chicago in 1942 under President Roosevelt. The first atomic bomb was detonated in New Mexico on July 16, 1945. The first U-235 bomb was dropped on Hiroshima on August 6, 1945, and a P-239 bomb was dropped on Nagasaki on August 9, 1945.

At the end of the war in 1946, President Truman signed the Atomic Energy Act and created a joint United States-Japanese Atomic Bomb Casualty Commission to study the effects of radiation on the Japanese nation. He also signed an executive order making the Oak Ridge National Laboratory reactor production of I-131 available to qualified physicians outside of the Manhattan Project. The first civilian shipment of Oak Ridge radioisotopes was made on August 2, 1946.


Case-of-the-Month

A 77-year old female presented with elevated serum calcium levels, which were discovered during workup for recurrent kidney stones. She was later found to have very high levels of serum parathyroid hormone (PTH) but no evidence of chronic kidney disease, and she was consequently diagnosed with primary hyperparathyroidism.

She was referred for a parathyroid scan with Tc-99m sestamibi. Immediate and 3-hour delayed static images of the neck showed washout of tracer from the thyroid bed with no retained tracer accumulation. There was focally increased uptake in the region of the right submandibular gland, but this was ultimately considered physiologic.

The referring endocrinologist felt that the patient must have an adenoma, so she decided to repeat the parathyroid scan after suppressing the patient’s thyroid function with levothyroxine. In theory, there would be less thyroid uptake of Tc-99m sestamibi. On the repeat scan 2 months later, the immediate images showed the same distribution of tracer uptake in the thyroid bed as on the previous scan, and the washout pattern was similar. Again, focally increased tracer accumulation was seen in the region of the right submandibular gland.

These images (planar and pinhole anterior images of the neck) are displayed here. Also displayed are SPECT/CT of the neck and upper thorax (one sagittal and axial slice) on the repeat parathyroid scan, which showed the focally increased tracer accumulation localized to the right submandibular gland, which was larger than the contralateral gland. The patient was referred to a surgeon, who resected tissue from the right submandibular gland that was positive for parathyroid adenoma. This lesion was felt to represent an ectopic adenoma from non-descended parathyroid tissue.

Niraj R. Patel, M.D., NMRO Board Member
About Your New President

My name is Erica Cohen, and I am honored to be your new NMRO president. Over the past year I served as your NMRO secretary and treasurer, and I am looking forward to all of the great things we will be accomplishing this year! I was born in Ft. Lauderdale, FL, and stayed there until I started college at the University of Florida (GO GATORS!). I majored in biology and minored in business administration and Tebowing. From there I moved back to Florida to attend medical school at Nova Southeastern University College of Osteopathic Medicine, where I also earned a Master’s in Public Health in a dual-degree program. During my four-year elective rotations, I visited Chicago for the first time and found it to be as amazing as my friends had described it. I felt drawn to nuclear medicine as the specialty that radiology residents knew the least about, and so I pursued a residency in nuclear medicine directly out of medical school. After finishing a very challenging year as a surgical intern, I have both loved and appreciated the past year that I spent in the nuclear department at Loyola University Medical Center. I am very passionate about our specialty and I look forward to continuing in the growth and development of the NMRO.

Spotlight on SNMMI 2012 Annual Meeting!

The Society held its 59th Annual Meeting June 9-13, 2012, in Miami, FL. The Annual Meeting is the premier scientific and educational event in the field of nuclear medicine and molecular imaging, drawing more than 5,000 attendees from around the world.

The SNM membership voted to change the name to Society of Nuclear Medicine and Molecular Imaging (SNMMI). “Retaining ‘nuclear medicine’ as part of the society’s name also recognizes the therapeutic, medicinal aspects of nuclear medicine,” said George Segall, SNM immediate past president. SNMMI has elected Frederic H. Fahey, DSc, as its new president.

Bismuth-213 (Bi-213) DOTATOC, the radiopharmaceutical used to treat gastroenteropancreatic neuroendocrine tumors (GEP-NETs), proved to be more effective than other therapeutic agents. This study, led by Alfred Morgenstern, PhD, won the Image of the year!

Some of the interesting research work that was presented at the meeting:

Utility of PET /MRI in Myocardial Perfusion. As Shelley Zhang noted in her talk, myocardial perfusion assessment can provide high diagnostic and prognostic information for the management of patients with coronary artery disease, but quantification of myocardial perfusion “remains a challenge” for the regional measurement of coronary flow reserve.

Role of Molecular Imaging in Detecting Alzheimers Disease. Studies with PET using F-18 florbetapir, PET with F-18 florbetaben, and a comparison of C-11 PiB PET and F-18 FDG PET were presented. The initial work on amyloid imaging seems to be promising.

PET/MRI Helps Tumor Staging in Pediatric Patients. Researchers from university of Munich found that magnetic resonance imaging alone was superior to FDG-PET and software-registered FDG-PET/MRI for primary diagnosis, but FDG-PET alone was better than MRI alone in the follow-up exams.

Many other interesting studies were presented under the cardiovascular, Instrumentation & Data Analysis, Molecular Targeting Probes - Radioactive and Nonradioactive, Neurosciences, Oncology: Basic, Translational & Therapy and Technologist Student Abstract tracks.

SNMMI honored several nuclear medicine and molecular imaging scientists for their contributions to the field. Congratulations to Daniel Berman, MD, de Hevesy Award recipient; Mark Goodman, PhD, Aebersold Award recipient; and Abass Alavi, MD, and Steve Larson, MD, Cassen Award recipients.

Somali Gavane, MD
NMRO Member
Myocardial Perfusion Imaging

Myocardial perfusion imaging (MPI) using single photon–emission computed tomography (SPECT) has been used to evaluate coronary artery disease over past two decades and remains the mostly widely used imaging modality in this field. The most commonly used radiotracers for the SPECT-MPI are TI-201, Tc-99m sestamibi, and Tc-99m tetrofosmin. All of these agents have considerable limitations. The TI-201 is notorious for its high radiation exposure to patients, relatively poor imaging quality, and continuous redistribution. Both Tc-99m-labeled tracers are vulnerable to significant artifacts due to soft tissue attenuation and proximal gastrointestinal activity. The relatively low first-pass myocardial extraction of the Tc-99m-labeled tracers also decreases the sensitivity to detect ischemic perfusion defects.

Recently, with the popularity of positron emission tomography (PET) in clinical usage, evaluation of myocardial perfusion using PET has drawn great attention. PET has several advantages over SPECT, mainly due to PET’s improved spatial and temporal resolution and less attenuation artifacts, which lead to improved sensitivity and specificity to detect perfusion defects. Currently, three PET tracers are approved in the United States to evaluate myocardial perfusion: rubidium-82 chloride, nitrogen-13 ammonia, and oxygen-15 water. Oxygen-15 water diffuses freely across the myocardium membrane and has the ideal first-pass extraction (100%), which significantly improves the sensitivity to detect perfusion defects. However, the myocardium and blood pool rapidly reach equilibrium. Therefore, visualization of myocardial perfusion requires complex correction techniques.

The short half-life (122 seconds) of oxygen-15 requires an onsite cyclotron and limits its clinical application. Nitrogen-13 ammonia has excellent first-pass extraction, although inferior to that of oxygen-15 water. Its short half-life (10 minutes) also limits its clinical use. It is also technically challenging to perform an exercise stress with such a short half-life. In contrast, rubidium-82 (half-life of 75 seconds) can be produced with an Sr-82/Rb-82 generator and is accessible to any imaging center that can afford renting the generator. Therefore, rubidium-82 chloride is currently the most widely used PET tracer for myocardial perfusion. However, rubidium-82 emits a very high-energy positron that travels a long distance in soft tissue prior to annihilation and demonstrates decreased spatial resolution compared with that of low-energy positrons. In addition, the first-pass extraction of rubidium chloride is lower than with other available PET tracers.

Very recently, new PET tracers labeled with fluorine-18 for myocardial perfusion have emerged and have been tested in both animals and humans. Using fluorine-18 as a PET tracer has significant advantages. Fluorine-18 has a half-life of 110 minutes, which is long enough to be distributed commercially from a regional cyclotron. It emits a low-energy positron—634 keV compared to 3356 keV from rubidium-82—thus, it has the shortest positron range and is expected to obtain the highest spatial resolution.

Among the F-18-labeled PET tracers, flurpiridaz F-18 has been extensively evaluated in both preclinical and clinical studies. Flurpiridaz F-18 is a structural analog of an insecticide called pyridaben and binds to mitochondrial complex I with high affinity. It has excellent first-pass extraction in myocardium (> 90%) with near-linear myocardial uptake versus blood flow, which is superior to ammonia. Flurpiridaz F-18 is rapidly accumulated in myocardium in a time-dependent manner with prolonged retention and minor washout and demonstrates better heart-to-lung and heart-to-liver ratios when compared to Tc-99m sestamibi SPECT. These favorable characteristics of flurpiridaz F-18 have made the absolute quantification of myocardial blood flow possible. In addition, the relatively long half-life and prolonged retention in myocardium of flurpiridaz F-18 indicate that exercise stress, a preferred stress method, is feasible with PET imaging.

In summary, flurpiridaz F-18 seems like an ideal PET perfusion tracer that has high extraction fraction, ideal PET resolution, possibility of exercise stress, availability of unit dose, and possibility of absolute quantification of myocardial blood flow. Currently, a phase III, multicenter clinical trial sponsored by Lantheus Medical Imaging, Inc., is underway to evaluate the accuracy of flurpiridaz F-18 PET in myocardial perfusion imaging. The early reports from the clinical data are very promising.

There is no doubt that myocardial perfusion imaging remains the pivotal technique to evaluate ischemic heart disease. With the prospect of transitioning from SPECT to PET technology in myocardial perfusion imaging in the near future, we will face a new generation of functional cardiac imaging.

Yuxin Li, MD
NMRO Member
I asked myself a question: What mobile apps could I find for my Droid using the typical budget one has for such things? So my search for free apps began. While I only found a few good apps and got sidetracked along the way, I am sure there are more hidden treasures out there, so please email me, Karen.Ayres@vanderbilt.edu (please note, Ayres not Ayers), if you have recommendations, and I will include them in a future Scintillator. I am not endorsing any apps, and I am not a computer genius, so please take these reviews at face value.

The neatest was one by Magellan Health Services and one of their divisions, NIA (National Imaging Associates), called Radiation Calculator (pictured to the right). After entering my gender and age, the app will tell me the estimated effective dose for a wide range of imaging procedures, from X-rays to cardiac perfusion scans. You can enter the date of the studies and turn this into your own ongoing radiation record, which I plan to do—not because I’m worried about radiation, but because it’s cool. It was extremely easy to figure out how to input these data.

Rating: ★★★★★ out of 5 because it didn’t include bone scans (did include the nebulous “DX Nuclear Medicine”—what test is that??), and it was unclear if 3 CTs should be entered if there were 3 phases or if that was just 1 scan of the abdomen.

An app called Nuclear Medicine calculator by Biodose looks enticing. It calculates decay, CCK dose, and Curie to Becquerel. The pediatric page includes all the eponymous rules for calculating pediatric activities. The average rating was 4 out of 5 stars. However, when I went to download it, one of the permissions requested was to allow it to make phone calls from my phone, so I chickened out! Anyone who has this, or who wants to tell me I am a wimp, email me your review and maybe I’ll toughen up and download it after all. It looks like a good app.

My search on the Google Play site for nuclear medicine did not reveal anything else useful, so I searched for technetium. When that didn’t turn up any results, I did a search for tech. That also failed to reveal nuclear medicine apps, but I did find TKA. Oh, you don’t know what that stands for? Techno Kitten Adventure, of course. The free version allowed me to fly a cat with a jet pack through a maze of alien spacecraft, dolphins, lasers, and rainbows while listening to techno music. Other than the saddening meow whenever I let my cat touch a starred line, it was quite an upper.

Rating: ★★★★★/5 … or should that be ★★★★★★★?? Cardinal Health has an MPI Radiation Absorbed Dose Calculator based, it states, on package inserts. It would be a cool app except I don’t believe it. After entering rest and stress activities for MIBI of 10.0 and 27.5 mCi, it told me the calculated effective dose equivalent was 6.3 mSv, instead of the 14-15 mSv it actually is.
External Affairs Update

Bon jour, holla, hej, hallo, shalom, namaste, salve, boas, salaam, tonk’peh, and hello. How we say things, what we perceive, and how we let it imprint on us is largely driven by one’s perspective. There are hundreds of ways to say the same thing, and a dozen people could each interpret that same passage differently.

From the point of view of a nuclear medicine resident, the world surrounding us is vast and ever changing–certainly filled with confusion and fog. I try to write this section with an objective purpose. I try not to take sides. I try to not let my standing as an NM resident cloud my interpretation of the facts.

The future of nuclear medicine is unsure, and it may be largely pushed in certain direction(s) by a tug-of-war between multiple parties. These may include and are not limited to; SNMMI, ACNM, ACGME, AMA, ARRS, and ACR.

I have no specific insight. I have no unusual personal contacts with society leadership. I do, however, listen—and I do, however, read. Specifically, I read with a critical eye “between the lines” of front-line articles and back-page editorials that pertain to our future.

As background, I would recommend:

2. Dr. James Gannon’s letter to the editor. JACR 2012;9(1):82-3.

In my opinion, as I have assimilated, there is a divergence between the intentions of the current nuclear medicine leadership and the ACR leadership. The ACR leadership seem to be pushing for a unified residency that would obviate straight nuclear medicine-training and to assimilate nuclear medicine training into diagnostic radiology residencies. The NM leadership seem to be opposing this. I think this is evidenced by the failure to progress of the joint task force that had been set up to define the way ahead for residencies.

Presently, with other leadership, we are establishing liaisons with nuclear medicine residencies in other countries. We hope to find out what successes they have achieved and how they have persevered. Hopefully, next time, those stories will be something to share and to be interpreted in many ways by all.

“I too sing nuclear medicine.” –MJ

Mickaila Johnston, MD, DMO
Vice President of External Affairs

ACNM NMRO Membership—Free for Residents!

The ACNM Nuclear Medicine Residents Organization (NMRO) would like to invite you and your fellow residents to join the NMRO. Membership is now free during your residency. All you need to do is complete the online membership application, and ask your program director to fill out the brief Program Director form, and you are all set.

NMRO members can take advantage of many complimentary member benefits, including the following:

- **Clinical Nuclear Medicine Journal** (online subscription)
  An online subscription to the Clinical Nuclear Medicine Journal is included with membership.

- **Quarterly Scintillator Newsletter**
  The NMRO quarterly newsletter has been a major highlight among NMRO members. The resident-run newsletter features articles that address resident and fellow specific issues, and also includes fun activities like the case-of-the-month and crossword puzzles.

- **Networking Opportunities**
  Participate in various networking opportunities organized by the NMRO. Members look forward to the NMRO Annual Business Meeting and Networking Luncheon all year! It is a great opportunity to listen to speakers, enjoy lunch, and network with colleagues.

- **Virtual Journal Club – NEW!**
  The recently launched NMRO Virtual Journal Club will be a series of regularly scheduled webinars in which a resident presents an article of interest for discussion among fellow residents.

- **Mentoring Program**

- **In-service and Board Guidance & Preparation**
  A question bank is available on the NMRO website to assist you in studying for the boards and in-training exam.

For more information, please visit our Residents webpage. We hope that you will take advantage of this outstanding opportunity!

Virtual Journal Club - September 27, 2012 at Noon EST

“The Great Amyloid Imaging Debate”
Presented by: Erica Cohen, DO, MPH, Abass Alavi, MD & Bob Henkin, MD

We are excited to launch the 2nd Virtual Journal Club (VJC) Webinar, and hope you will join us. Erica Cohen, DO, MPH, NMRO President, will be hosting the September journal club, and presenting a comprehensive review several articles related to Amyloid Imaging Debate.

Please note that CE credit will NOT be provided for this one-hour webinar. If you are unable to participate live, the webinar will be recorded and available on the ACNM website following the session.

To register for the September Virtual Journal Club – please visit the ACNM website at www.acnmonline.org.
Review of Multiple Endocrine Neoplasias

Find the organs or lesions involved in the MEN-I, MEN-IIA, and MEN-IIB Syndromes.
Do you remember which organ/lesion is associated with which syndrome?

C J M E O V A F N M H S H C Q C V M
K A A D P I M L C Q S A A B P A B B
M Q A F I W O R A B P E W B L O C C
Z D M Y Q V R J P A U R Q G H P R W
J B O M F O U E F J I C S S Z Q L B
S Y T Y N Z E H P M S N N P Y G W O
F W Y R S D N T C E S A N A Q U A I
Q Q A E O O H C Q Z P B R Z R J M
Q T O T L L I Y L W B D F A W H T S
F U M I K X L R O G S Q F T I A R L
U R O U X U G O A J X B C H U L L J
H R R T H L N I X C H Z H Y J M S D
K G H I C W A D Q Q M W X R V J P O
F U C P R K G J J X M L B O V C P E
M E O S N A W Z Y E Z E Q I P B V G
F U E F Y H V R Y S P O L D C X G T
J V H Y V B M E G O M K N C Z L F V
P N P Z K I K K T L J K Q H Y D L R

Answers: 1-D-b, 2-B-c, 3-A-a, 4-C-d