ISAR News
Newsletter of the International Society for Antiviral Research

Report on the 26th ICAR 11–15 May 2013, San Francisco, CA, USA

President's message (Phillip Furman)

The 26th ICAR is now behind us and I am pleased to report that the conference was a great success. The Society has invested a significant amount of work over the past years in revitalizing the annual meeting. These efforts have been recognized and affirmed by the results of our post-conference surveys, which provided considerable positive feedback along with constructive suggestions and comments. Thanks to all of you who have responded to these important surveys.

The success of this year's ICAR is due to a talented team of dedicated individuals with whom I had the privilege of working to plan the conference. First, thanks go to the ISAR officers Joe Colacino, Past President, Bob Buckheit, President-elect, Graciela Andrea, Secretary, and Dale Barnard, Treasurer. Mark Prichard, Chair of the Program Committee, with the help of Bob Buckheit, and Joe Colacino who served as Conference Chairman, did a superb job organizing this meeting and are thanked and congratulated for the high level and diverse scientific content presented at the meeting. Thanks go to Board Member and Finance Committee Chair Roger Ptak for doing an outstanding job of acquiring financial support and sponsorships for the meeting.

Thanks also go out to Andrea Brancale for maintaining the ISAR website throughout the year and especially during preparation, advertising and registration for ICAR; Rich Whitley and the Scientific Excellence Awards Committee who carefully evaluate and select the recipients of the Elion and Prusoff awards from the nominees submitted by members of the society; Hugh Field and Anthony Vere Hodge and the Publication Committee who work hard to ensure the highest quality publication of the ISAR News and Scientific Meeting Report. They have been integral in maintaining a productive working relationship with Elsevier, publisher of *Antiviral Research* and International Medical Press, publisher of *Antiviral Therapy*. The Society wishes to thank International Medical Press for publishing ISAR News for several years and for publishing issue 22.2 in the last issue of AVCC (February 2013) which has now ceased publication. Because of this, the Society had no publisher for ISAR News. Thanks to the efforts of Mike Bray, Hugh Field, and Anthony Vere Hodge, Elsevier will now publish ISAR News and the Scientific Meeting Report in *Antiviral Research*. The smooth transition was greatly assisted by Alina Helsloot (Elsevier) who came to ICAR.

A special thank you goes to Amy Patick who organized the Women In Science luncheon and discussion session, which was a tremendous success. Board members Johan Neyts and Tomas Cihlar, Chairs, of the Membership and Career Development Committees, respectively, worked assiduously to organize networking events to increase the Society's membership and to reach out to new members and young investigators. Finally, I would like to thank Lauren Deaton and Elizabeth Haxton of Courtesy Associates for their efforts in coordinating and facilitating the meeting and ensuring everything ran smoothly.

As mentioned above, the scientific program for the 26th ICAR, which included keynote, plenary, and mini-symposium speakers, was excellent and well received. Eva Harris delivered this year's Keynote lecture and Bruno Canard gave a plenary lecture. This year, Tomas Cihlar and Graciela Andrei organized a special symposium, 'Legacy of Tony Holý: Nucleotides in the Treatment and Prevention of Chronic Viral Infections', in honour of the memory of Professor

Elsevier, National Institutes of Health, PTC Therapeutics, Chimerix, Inc., Southern Research Institute, Gilead Sciences, GlaxoSmithKline, JCR Pharmaceutical Co. Ltd., Toyama Chemical Co., Ltd, Hoffmann-La Roche, Biota Holdings, Apath, LLC., Center for Drug Design, University of Minnesota, Gemmus, Virodefense, Novira, Flamma, Medivir, Idenix Pharmaceuticals, Avexa Ltd., LabCorp (Monogram) Bristol-Myers Squibb, Express Biotech International

Antonín (Tony) Holý and his discovery of significant treatments for HIV and HBV and his contributions to antiviral research and medicinal chemistry. At the end of the symposium Tomas Cihlar announced that Gilead Sciences will support the Antonín Holý Medicinal Chemistry award to be given annually at ICAR to a senior investigator of international stature whose expertise in chemistry has made a major impact on antiviral drug discovery and/or development.

Mike Sofia and Paul Scola organized two mini-symposia this year, 'Strategies and Tactics in Drug Design' and 'Prodrugs as a Tool in Drug Discovery and Development'. Both symposia were well attended and received favourable feedback. We also continued our interactive workshop 'Drug Discovery and Development 101', our Clinical Symposium, and the Shotgun poster session consisting of oral presentations of selected posters by young investigators. Each presenter did an outstanding job presenting his or her research. A popular event of the ICAR is the selection of posters, presented by young investigators, for special recognition. The hard working Poster Awards subcommittee, chaired by Kathie Seley-Radtke carefully reviewed posters submitted for special recognition and selected winners based on scientific excellence and the ability of the author to present his or her work. This year, as in past years, the winners were recognized at the closing banquet. My congratulations to the winners of this year's poster award contest – well done.

One of the major events at each ICAR meeting is the presentation of the Elion Lecture Award and the Prusoff Young Investigator Lecture Award. Our heartiest congratulations go out to Masanori Baba and Andrea Brancale, this year's Elion and Prusoff award recipients, respectively. Masanori's lecture was entitled 'My Antiviral Research in Fukushima, Leuven and Kagoshima' and Andrea's lecture was entitled 'From Irrational to Rational Antiviral Drug Design.' Again, congratulations and we wish them both continued success.

This year an election was held to fill three Board of Director seats and congratulations go out to the three new Board members: Katherine L. Seley-Radtke (Professor of Chemistry & Biochemistry, University of Maryland, Baltimore, USA), Andrea Brancale (Senior Lecturer in Medicinal Chemistry, School of Pharmacy and Pharmaceutical Sciences, Cardiff University, Cardiff, UK), and William Delaney (Director, Biology at Gilead Sciences, Foster City, California, USA) who were strongly supported and duly elected. Our thanks go out to three very talented and exceptional individuals: Johan Neyts, José Estè, and Heather Greenstone, whose terms as Board Member expired this year, for their dedication, support and excellent counsel.

We are now busily engaged in planning the 27th ICAR that will be held in Raleigh, North Carolina, USA, May 12–15, 2014. My fellow officers and I, as well as the Board Members and Committee Chairs, continue to strive to provide a conference of the highest scientific quality. I wish you all a wonderful and relaxing summer and look forward to seeing you next year in Raleigh.

Scientific report: Highlights of 26th ICAR, 11–15 May 2013, San Francisco, CA, USA (Anthony Vere Hodge)

This review provides an overview of the conference highlights. As this is a research conference, any refer-

Figure 1. Legacy of Tony Holý: Erik De Clercq (left) and John Martin (right) giving their tributes

ences to clinical results should not be taken as a recommendation for clinical use. I wish to thank all those authors who have kindly provided me with copies of their presentations and for giving me valuable comments.

This summary has abridged reports on the symposium in memory of Antonín (Tony) Holý, then the presentations by the recipients of the Society's two major awards and the keynote and plenary lectures. Please see the ICAR Scientific Report in *Antiviral Research* for the full reports and for an account of the clinical symposium, and the two chemistry mini-symposia, *Strategies and tactics in drug design* and *Prodrugs as a tool in drug discovery and development*.

Legacy of Tony Holý: Nucleotides in the Treatment and Prevention of Chronic Viral Infections

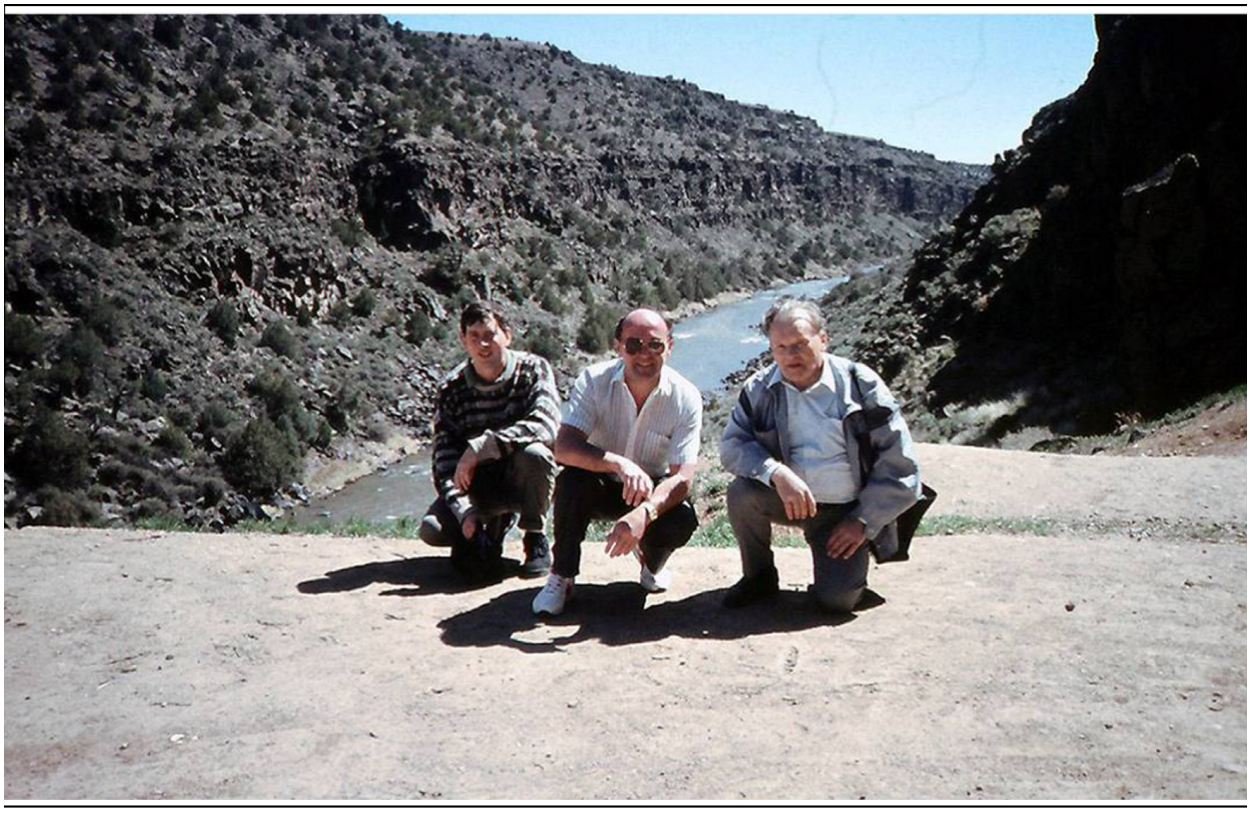
A personal note on the contribution and legacy of Antonín Holý by Erik De Clercq (KU Leuven, Rega Institute for Medical Research, Leuven, Belgium)

Erik first met Antonín (Tony) Holý at a symposium on Synthesis of Nucleosides, Nucleotides and Polynucleotides, 3–5 May 1976 in Göttingen (Germany). Erik felt both out of place but also privileged to be the only MD present amongst so many PhD chemists. Similarly, Erik found himself with many chemists at the NATO meetings in 1979 and 1983. The meeting, at Il Ciocco, Italy in May 1987, can be regarded as a model for ICAR meetings. Tony Holý became a regular attendee at ICAR meetings.

The first clinical success was Duvira® gel which was licensed in Czechoslovakia for herpes labialis but it was the series of phosphonate compounds which led to the exceptional success of tenofovir. Tenofovir, as its oral prodrug, was approved for HIV therapy in 2001 and, in combination with emtricitabine (FTC) as Truvada, was approved in 2004. Atripla (combination of truvada and efavirenz) was approved in 2006. Complera (in USA) [and Eviplera (in Europe)] was approved in 2011, and the "Quad pill" Stribild (containing tenofovir, emtricitabine, elvitegravir and cobicistat) was approved in 2012 (in USA) and 2013 (in Europe). These single-tablet regimens, all of which contain tenofovir as a key component, have transformed HIV therapy and seem to be giving patients many years of near-normal life.

When at Olomouc, Erik noticed a Unesco-classified monument dedicated to "The Holy Trinity". That stimulated Erik's thinking. He was one of a team, Tony Holý the chemist, Erik the MD and John Martin (also a chemist) from Gilead It seemed as if Erik and John were part of a different trinity, "a Holý trinity". Erik showed several photographs of this "Holý trinity" in various exotic locations including the Rio Grande Gorge (New Mexico) in 1995 when the ICAR meeting was at Santa Fe (Figure 2).

Figure 2. The Rio Grande Gorge (New Mexico) in 1995 when the ICAR meeting was at Santa Fe, "a Holý trinity" at work



Truvada was approved for prophylactic use, to prevent the spread of HIV, on the very day that Tony Holý died (16 July 2012).

Tribute to Antonin Holý by John Martin (Gilead Sciences, Foster City, CA, USA)

John may not have recognised himself as part of a ''Holý trinity'' but we were fortunate to have him as the next speaker – as for Tony and Erik, John has had a long and close association with ISAR.

Tony Holý was born in 1936. He synthesized his first nucleotide, (S)-DHPA (published in Science in 1978) and the first phosphonate, (S)-HPMPA was published in Nature in 1986. As Erik described, this led to tenofovir.

The ''Holý trinity'' has had another major success, enabling HIV-infected patients anywhere to be treated with tenofovir through the Expanded Access Program established by Gilead. Both Tony and Erik waived their royalties for sales in countries with poor access to health care. John ended his tribute showing photographs of Tony at his 70th and 75th birthdays, the latter in Prague in 2011.

Tributes focussed on various successful clinical outcomes

Robert Schooley (University of California, San Diego, CA, USA) summarised the progression of tenofovir, first as the prodrug (TDF), then in combination with emtricitabine (FTC), known as Truvada®. In a ground-breaking move, Gilead and BMS cooperated to simplify HIV therapy by combining three drugs (truvada with efavirenz) to form a single, once-a-day pill, Atripla® (licensed 2006). Some patients have been taking tenofovir for 12 years.

Robert Grant (University of California, San Francisco, CA, USA) focussed on the potential role of tenofovir for the prevention of HIV transmission. Prevention can be attempted by starting therapy either prior to exposure (PrEP) or post-exposure (within 72 h but before clinical signs) (PEP). Truvada (FTC/TDF) is being evaluated in a clinical trial, with prophylactic dosing, (PrEP). This trial revealed many problems, mainly due to poor adherence. One factor may have been the very long consent forms which included 7 pages of potential side effects. With so many missed doses, intention-to-treat analyses become rather meaningless and so the analyses focused on the outcomes relative to the amount of drug taken. Most (93%) of new infections were in subjects with no detectable drug. In contrast, it seems that there were no seroconversions in subjects taking drug daily. An important conclusion from this work is that prophylactic therapy may help to destigmatize therapy.

Henry Chan, (Chinese University of Hong Kong) described how nucleotide analogues had greatly improved therapy for HBV. Adefovir dipivoxil (ADV) gave better control of viral load than previous therapies but it was not really active enough. With tenofovir (TDF), nearly all treatment-naïve patients achieve viral suppression. At 5 years, 73% of patients had an improved liver fibrosis score ($\geqslant$2 units) and that most of the other patients had no worsening. This was the most substantial efficacy seen for reducing liver fibrosis. TDF is now internationally accepted as the first-line therapy for HBV and recent guidelines include the option of monotherapy with TDF. However, a problem remains for patients with ADV-resistant HBV, as such patients do not respond well to TDF therapy.

To date, nucleotide analogues have not been much used in the treatment and prophylaxis of herpes and other DNA virus infections. Richard Whitley (University of Alabama at Birmingham, AL, USA) described how acyclovir (ACV) has remained the mainstay for treatment of herpes simplex virus (HSV) types 1 and 2 in the newborn. For cytomegalovirus (CMV) infections in the newborn, ganciclovir (GCV) and its prodrug, valganciclovir (VGCV), have been the drugs of choice. Further in the future, combination with CMX001, a prodrug of cidofovir, may be investigated. This drug is currently in Phase II trials for prevention of CMV disease in transplant patients.

An overview of the future potential and therapeutic opportunities for nucleoside phosphonates was presented by Tomas Cihlar (Gilead Sciences, Foster City, CA, USA). Over a period of 3 decades, including 2013, there have been 7 approved therapies arising from Tony Holý's initial work on phosphonates. These include agents for the treatments for HIV, HBV, and herpes viruses. The discussion of future opportunities included new drug development against HIV, HBV, and other DNA viruses. For HIV therapy, a new prodrug for tenofovir (TFV), tenofovir alafenamide (TAF) is currently in Phase III development. TAF is being tested as a part of new single tablet regimen containing TAF, FTC, elvitegravir and a pharmacoenhancer cobicistat. CMX157, a phospholipid-based prodrug of TFV, is currently in Phase 1.

While targeting RNA viruses by nucleoside phosphonates remains a major challenge, several examples of potential additional applications of nucleoside phosphonates outside the antiviral therapy were mentioned. Some new phosphonates have good activity in cell culture against *Plasmodium*, the malaria pathogen. In addition, GS-9219, a prodrug of PMEG, is in advanced stages of development for applications in veterinary oncology.

At the end of his presentation, Tomas announced the establishment of a new ISAR award as a memorial to Tony Holý. The first award will be presented at the 2014 ICAR in Raleigh, North Carolina, USA. The Awardee will receive a commemorative plaque, a monetary award and present a lecture at ICAR on

Figure 3. Gertrude Elion Memorial Award winner: Masanori Baba

research work. The nominee must be a senior scientist of international stature in medicinal chemistry and who has made innovative contributions impacting antiviral drug discovery and/or development.

Gertrude Elion Memorial Award Lecture: My Antiviral Research in Fukushima, Leuven and Kagoshima by Masanori Baba (Kagoshima University, Kagoshima, Japan)

Masanori opened his lecture with his thanks to his "great professors", Shiro Shigeta and Erik De Clercq. He graduated from Fukushima Medical College in 1980 and entered the Graduate School of Medical Sciences.

Masanori's initial studies at Fukushima, from 1980 to 1986, were with varicella zoster virus (VZV). Soon, he was collaborating with Erik, discovering the potent activity of BVDU and BVara U against VZV. This led to his time as a postdoc at Leuven from 1986 to 1989. His close colleagues were Rudi Pauwels, Jan Balzarini and Dominique Schols. The group was investigating the HIV activity of a new class of compounds, phosphonyl purine derivatives. His first paper included Tony Holý as a co-author. They discovered the anti-HIV activity of PMEA (adefovir) which was followed later by PMPA (tenofovir). This group developed a rapid and efficient assay to test compounds and this paper "Rapid and automated tetrazolium-based colorimetric assay for the detection of anti-HIV compounds" was published in J Virol Methods 20 (1988) 309-321. This paper has been cited 1248 times.

Masanori returned to Fukushima in 1989 and moved to Kagoshima University in 1994. Three projects have produced interesting results: the discovery and development of CCR5 inhibitors with activity against HIV-1; the identification of festinavir® (4′-ethynyl-d4T) as a novel nucleoside HIV-1 RT inhibitor; the discovery and development of biodegradable nanoparticles (NPs) with efficient antigen-carrying capacity giving potent adjuvant activity.

For further details of each of these projects, see the ICAR Scientific Report.

William Prusoff young investigator award lecture: From irrational to rational antiviral drug design by Andrea Branclae (Cardiff University, Cardiff, Wales. UK)

Andrea started with a reference to a 1959 paper entitled "Synthesis and biological properties of iododeoxyuridine, an analog of thymidine" by William D Prusoff.

The discovery of bicyclic nucleic acids (BCNAs) was certainly a good example of irrational drug design. A key step was dependent on the UK Royal mail and the Belgian postal service. A nucleoside analogue, with no activity against HSV, apparently had activity against VZV (EC_{50} 1 μM). Repeat testing showed that the compound itself was inactive but that the postal services had inefficiently converted the nucleoside into a bicyclic compound (about 1% conversion) which actually was a very potent inhibitor of VZV (EC_{50} 0.08 μM). Further work led to FV100 which has been progressed to Phase II trials.

In an attempt to rationalize the discovery of nucleoside analogues for the treatment of hepatitis C,

Figure 4. William Prusoff Young Investigator Award winner: Andrea Brancale

Andrea started by modelling the HCV polymerase. However, ''Pol is just one player''; nucleosides have a long path from drug to active triphosphate. Clearly, it would be useful to have a global model, including all the enzymes typically involved in nucleoside activation (or inactivation). So NAOMI was born. Currently, NAOMI has 21 enzymes.

Another potential HCV target is the helicase. It has a nucleoside-TP binding site, a long channel for holding the dsRNA and possible allosteric sites. It is difficult to predict the structure of a small molecule which would bind strongly into the long channel but ''Ligbuilder'' produced such a compound. The large number of chiral centres makes it an impractical molecule to synthesize but chemists can recognize patterns enabling simpler compounds to be designed. The next step forward was to link the computer to a joystick pointing device which allows the operator to control the position of the molecule in 3D. As the molecule approaches the enzyme, the computer calculates the forces between the molecule and the enzyme and quickly feeds that back to the joystick. The conclusion is that human input remains a key part of computer-aided design.

Keynote address: Know thine enemy: using virology and immunology to develop a multifaceted approach to dengue antivirals by Eva Harris (University of California, Berkeley, CA, USA)

Dengue virus has four serotypes (DENV-1, 2, 3 & 4), each of which includes several genotypes which can be subdivided into clades. It is estimated that about 100 million people become ill each year but, fortunately, only rarely (about 500 thousand cases) does the infection develop into a rapidly progressing disease, often fatal. Many people, possibly 400 million, become infected but have no symptoms. This is important because a previous infection gives protection to a later infection with the same strain but enhances disease progression with a different strain. Understanding the reason for this is vital prior to trying to find a vaccine.

DENV has two mechanisms for entry into cells: via receptor attachment and via antibody. The latter mechanism explains how a previous infection can enhance disease progression – instead of antibody binding to the virion and leading it to its inactivation, the bound antibody gives the virus an additional route into Fc receptor-bearing target cells.

Infection of mice with any of the 4 minimally-adapted DENV serotypes causes a self-limiting disease, while transfer of antibody alone can mediate a lethal disease (known as antibody-dependent enhancement, ADE). A fusion loop antibody is cross-reactive against all serotypes. A specifically mutated monoclonal antibody looses a glycosylation site, disabling its ability to bind to the cellular receptor. In the mouse model, this disabled antibody inhibits ADE. This approach may not be able to prevent the common, relatively mild disease due to DENV but it would be a great advance to be able to prevent the progression to serious, often fatal, disease.

Plenary address: RNA Synthesis, Capping and Repair in (+)RNA Viruses:
Novel Targets for Drug Design by Bruno Canard (Harvard Medical School, Boston, MA, USA)

In this plenary presentation, Bruno reviewed the crucial role played by the non-coding regions at each end of the viral RNA in the replication of RNA viruses. For replication, the virus has to acquire a cap. Essentially this can be done in one of three ways, to create a cap using viral enzymes, to steal a cap from a host RNA or to use the host capping process in the nucleus. Each of these strategies has been adopted by different viruses.

Both flaviviruses and coronaviruses have viral enzymes involved in making a cap. Flaviviruses can preserve the conserved sequence even when the input virus has been altered. Much has been discovered about coronaviruses since the SARS outbreak. Surprisingly, the protein in the SARS virus seems to have the correct sequence to be a capping enzyme but it has no activity *in vitro*. It becomes active when it forms a complex with another viral protein.

Conclusion

This ICAR meeting had many interesting presentations. Perhaps more than in recent years, reports on clinical results and on chemistry-related topics were well represented. It is impossible to record all these in this review, but it is hoped that this report is indicative of the range of topics covered.

Undoubtedly, a highlight of this conference was the symposium ''Legacy of Tony Holý''. The first two speakers, Erik De Clercq and John Martin, were his closest collaborators. Through the work of these three, HIV-infected people throughout the world are living near-normal lives. Robert Schooley, Robert Grant, Henry Chan, Richard Whitley and Tomas Cihlar focussed on the different areas inspired by Tony's work.

This year, the two major award lectures covered very different areas of research – a good illustration of ICAR's strength in bringing differing disciplines together. The keynote address, the plenary lecture, the clinical symposium and the mini-symposia gave a good overview of progress in the area of antiviral research. The clinical symposium proved that antiviral chemotherapy is continuing to make important new progress although the areas of progress seem to vary from year to year.

Over several years at ICAR meetings, but notably not in 2012, there were presentations updating the

progress of apricitabine (ATC) through clinical trials. ATC showed exceptional barrier to HIV resistance. Both at ICAR 2012 and at this meeting, there were reports on another interesting nucleoside analogue, festinavir (4′-ethynyl-d4T), which has good activity against many resistant HIV mutants. The continued development of these compounds seems to be more dependent on economics than their scientific merit.

I would like to add my thanks to the ISAR Officers and Conference Committee for organizing another interesting and successful ICAR meeting.

Poster Award Recipients in 2013 ICAR (Katherine Seley-Radtke)

This year's poster award competition was one of the largest in recent history of ICAR. Nearly 70 posters were submitted for judging by the poster awards committee. A new procedure was tried out just prior to the meeting thanks to Dr. Andrea Brancale's new poster website. It involved those competing uploading their posters online so that the judges could preview them ahead of time. Since the process was only a week old, not everyone was successful. However, next year's competition should see the new process being fully utilized by all participants. In addition, while those competing next year may upload more than one poster, they must designate which one poster they want to be considered for a prize. This will also allow the poster committee to do some preliminary review and to know which entries to judge. We are very grateful to Andrea for putting together this new and very useful tool!

This year's Poster committee judges included Kathie Seley-Radtke (Chair), Graciela Andrei, José Estè, Brian Gentry, Gilles Gosselin, Chris Meier, Jennifer Moffat, Johan Neyts, Eric Stavale, and Zhengqiang Wang and Zlatko Zaneba with extra help from Andrea Brancale, Cyril Doussant and Robert Geraghty.

Awards: Out of the nearly 70 competing posters, the committee awarded a first place prize ($1000 each) in all three categories, with several other second place awards ($500 each).

In the Graduate Student category, the first place prize went to Ms. Annelies Stevaert (Rega Institute, KU Leuven) for her poster #92 - "Mutational Analysis of the Binding Pocket of Diketoacid L-742,001 in the Influenza PA Endonuclease". Her achievement was particularly notable since Annelies won second place last year for a completely different project!

The second place winners in the Graduate Student category were Ms. Celine Lacroix – Poster #59, Ms. Dionna Scharton – Poster #168, Ms. Melissa Williams – Poster #103, and Ms. Usha Lingappa, an undergraduate student, for Poster #153!

In the Postdoc category, the first place prize went to Dr. Hendrik Jan Thibaut (Rega Institute, KU Leuven) for his poster #172 – "Binding of Glutathione to

Figure 5. 26th ICAR Poster Award winners with Katherine Seley-Radtke (left) and Phil Furman (right)

Enterovirus Capsids is Essential for Virion Morphogenesis and Depletion of Glutathione Results in an Antiviral Effect''. The second place prizes went to Drs. Ivan Krylov – Poster #151 and Mansoora Khaliq – Poster #55.

In the Young Investigator category, the first place prize went to Dr. Yanming Du (Pennsylvania Commonwealth Institute) for his poster #140 – ''N-Alkyldeoxy-nojirimycin Derivatives with Novel Terminal Tertiary Amide Substitution Active Against Multiple Hemorrhagic Fever Viruses''.

Congratulations to all of the winners (Figure 5) and we look forward to an equally exciting competition next year!

Women in Science Roundtable (Amy Patick)

This year, ISAR launched its first Women in Science (WIS) Roundtable, which was a great success with 41 participants. This forum allowed Society members and ICAR attendees, both women and men, to come together to discuss the challenges and opportunities encountered by female scientists while navigating the twists and turns of career progression in today's environment.

The roundtable utilized a lively ''speed dating'' approach in which participants moved from table to table to sample such topics as: Do Super-Women Exist: How to balance work and family through all life stages; Where Do I Go From Here: Maximize the benefits from the mentor/mentee relationship; Negotiation: Tips on how to secure a mutually advantageous outcome without selling yourself short; Is There a Glass Ceiling Left to Crack: How to manage work force equality; Awards and Recognition: Are they worth it and how to get on the short list?; Goals, Goals, Goals: Learn to self-promote effectively to achieve your professional goals.

The moderators were a veritable Who's Who in ISAR and included: Graciela Andrei, Rhonda Cardin, Heather Greenstone, Jennifer Moffat, Amy Patick, Anneke Raney, and Karen Watson-Buckheit (Figure 6). The room was abuzz with excitement and enthusiasm; post-meeting comments such as ''I felt engaged,'' ''I thought I was the only one who has this issue,'' ''I now have a different perspective on this issue,'' highlighted the value of this forum. We are planning another WIS Roundtable next year, to be held at the beginning of the conference to maximize the opportunities for new connections among participants. We look forward to seeing you there. Special thanks go to Lauren Deaton and Elizabeth Haxton for help in organizing this session and to Justin Julander and Joy Feng for photography.

Business meeting (Graciela Andrei)

The Society held its business meeting during the 26th ICAR in San Francisco. The President, Treasurer, Secretary, and the Chairs of the different Committees provided their reports.

Figure 6. Amy Patick (centre) with the moderators for the first ''Women in Science Roundtable'' at ICAR

Figure 7. Graciela Andrei leading one of the discussion groups

Phil Furman, President of the Society, announced the results of the elections held last year and congratulated the three new Board members: Dr. Katherine L. Seley-Radtke (Professor of Chemistry & Biochemistry, University of Maryland, Baltimore, USA), Dr Andrea Brancale (Senior Lecturer in Medicinal Chemistry, School of Pharmacy and Pharmaceutical Sciences, Cardiff University, Cardiff, UK), and Dr William Delaney (Director, Biology at Gilead Sciences, Foster City, California, USA) who were strongly supported and duly elected. An electronic (web-based) election was run and an e-mail was sent to 353 registered members. A total of 98 voters responded, representing a 28% 'turnout' which compares with 62 of 176 members (35% 'turnout') for the previous election.

Joe Colacino, Past President of the Society and Conference Chairperson, presented Raleigh as the location for the 2014 conference, May 12–May 15. The 27th ICAR meeting will be held at the Raleigh Convention Center with Randall Lanier and Ron Swanstrom as local organizers. Rome, the eternal city, is now being considered as venue for the 28th ICAR meeting with Prof. Romano Silvestri as local organizer. Three places were proposed as venues for the 28th ICAR: the Domus Mariae-Palazzo Carpegna Hotel, the Frentani Conference Center and the Domus Pacis-Torre Rossa Park Hotel. Members were kindly requested to submit suggestions for future ICAR meetings to Courtesy Associates.

Dale Barnard, Treasurer, presented the Society's financial report for 2012 (Tables 1 and 2). A summary of the accounts for the 25th ICAR held in Sapporo, Japan, in 2012 was also provided (ISAR News 22.2). Thanks to the efforts of Roger Ptak (Chair of the Financing/Corporate Sponsorship Committee) to secure corporate sponsorship for the 25th ICAR and Masanori Baba to obtain generous support from the Federation of Pharmaceutical Manufacturers' Associations of Japan (FPMAJ), the City of Sapporo and JAAT, the 25th ICAR Meeting in Sapporo had revenue of $2,280, even though there were fewer attendees than at previous ICAR meetings. The 26th ICAR Meeting in San Francisco is expected to provide a positive balance. Roger Ptak provided an overview of corporate support for the 26th ICAR Meeting with a total contribution of $132,600 from various sponsors, to whom the Society is grateful (see foot of first page of this ISAR News).

A report on the 2013 ISAR Membership was also provided by Graciela Andrei, Secretary of the Society. Thirty-three countries are represented in the Society, with a total of 409 members as April 2013. A total of 302 attendees from 25 different countries registered for the 26th ICAR. This year, the Society awarded a total of 45 Travel Grants (26 for PhD students, 9 for post-doctoral fellows and 10 for investigators) to help defray the costs of attending the conference. An increase in the budget for travel grants was made

available for the 26th ICAR meeting based on the increased amount of travel grants applications. The total amount awarded was $44,975 or €34,320. A world-wide distribution [Africa (4), North America (12), South America (1), Asia (11) and Europe (17)] of the Travel Grants was reported. Travel funds include travel expenses but not meeting registration or hotel expenditures. Members were encouraged to consult the ISAR website for instructions on applying for Travel Grants and to apply as early as possible to avoid missing out.

Tomas Cihlar provided a report from the Career Development Committee that organizes the ICAR Career Forum each year. Representatives of different sectors, including academia, government, small Biotech, mid-size Pharma, large Pharma and CROs, were present at the Career Forum. This provides an opportunity for discussions on career lines and choices, and helps students to establish contact with senior members and learn from their experiences. Placement advertisements continue to be offered at the ISAR website, under Career Opportunities. International advertisements of available positions are open to everyone and do not require ISAR membership. Advertisements will be posted for 3 months and are free of charge. Tomas Cihlar and Andrea Brancale are the contact persons for posting placement advertisements. The Society would like to acknowledge and thank this year's career discussion moderators: Eva Harris, Jennifer Moffat and Brent Korba (Academia), Sina Bavari and Christopher Tseng (Government), Randall Lanier and Simon Tucker (small Biotech), Robert Jordan and Raj Kalkeri (Mid-size Pharma), Paul Scola and Mike Robinson (Large Pharma) and Jim Noah and Eric Stavale (CRO) for their participation at the 26th ICAR Career Forum.

Figure 8. "Raleigh Acorn" (Courtesy of GRCVB/visitRaleigh.com)

Mark Prichard, Chair of the Programme Committee, discussed the features of the 26th ICAR program and acknowledged the members of the Program Committee: Robert Buckheit, Jr., Tomas Cihlar, Michael Sofia, Paul Scola, Chris Meier, Graciela Andrei, Donald Smee and Johan Neyts. This year the program included: 27 invited lectures in 4 mini-symposia and in 1 interactive workshop, 1 Keynote Address, 1 Plenary Lecture, Elion and Prusoff Award Lectures, oral presentations (29 abstracts plus two late breakers) and poster presentations (143 abstracts plus 13 late breakers). A Shotgun Poster Session was also included in the 26th ICAR meeting.

Because of the "green" approach the Society is taking, no abstract book was published and attendees received the abstracts and program in electronic form. The fact that no abstract volume is published allows significant flexibility in abstract submission deadlines. ISAR will continue with this "green" approach and no abstract book will be published for the next conferences. The ICAR program and abstracts will be available through the ISAR website and can be printed as desired.

Kathie Seley-Radtke, chair of the Poster Awards Committee, reported on the 2012 award winners. The Society awards prizes for excellence in scientific poster presentations each year. The process and eligibility criteria for the three categories of poster awards, i.e. graduate students, post-doctoral fellows and young investigators were described. This is a very stimulating initiative for presenters of the different categories. Kathie Seley-Radtke announced the members of the Poster Award Committee for this year's meeting. This is a very motivated team of researchers that evaluates and scores each poster and award recipients are announced at the annual ICAR banquet.

The President closed the meeting by thanking everyone and encouraging members to get involved in the activities of the Society.

The 27th ICAR in Raleigh (Joe Colacino)

On behalf of the Conference Committee, I am pleased to extend an invitation to all ISAR members and their

Table 1. Financial statement for year ending 25th April 2013

International Society for Antiviral Research Financial Statement for 2013 4/25/2013	
2013 Income	
Membership Dues	$8,805
Corporate Support	$107,600
Registrations for ICAR	$141,610
Interest	$50
Total	**$258,065**
2013 Expenditures	
Administrative	$3,430
ICAR	$172,430
Membership Services	$316
Total	**$176,176**
Balance	**$81,889**

Table 2. Net assets statement

International Soceity for Antiviral Research 4/25/2013	
Assets	
Bank Accounts	$595,010
CD's	$103,549
Investments	$197,177
Total	**$895,736**
Liabilities	
Accounts Payable	$0
Total	**$0**
Net Assets	**$895,736**

colleagues to join us for the 27th International Conference on Antiviral Research (ICAR) May 12–15, 2014. After our successful conference in San Francisco, we are moving to the east coast and the beautiful city of Raleigh, North Carolina where Randall Lanier (Chimerix, Inc.) and Ronald Swanstrom (University of North Carolina, Chapel Hill) will serve as local organizers. Raleigh, named for Sir Walter Raleigh, is the second largest city in North Carolina and is the capital of the state. Its nickname is the "City of Oaks" (Figure 8) because of the many stately oak trees in the city center where you will also find quaint shops and many interesting places to dine and relax. Along with Durham and Chapel Hill, Raleigh is one of the vertices of the famous Research Triangle which boasts three major research universities (North Carolina State, Duke, and UNC-CH as well as numerous biotech and pharma companies including Chimerix in Durham and GSK in Research Triangle Park. We selected Raleigh because of its location near academic and industrial laboratories, its serene, laid-back yet cosmopolitan atmosphere, and its relative ease of access. The Raleigh-Durham International Airport serves the Research Triangle metropolitan area as well as much of eastern North Carolina where you can find ample opportunities for recreation in the Great Smoky Mountains. We are sure you will find Raleigh a city that will offer many opportunities for productive scientific exchange and networking as well as cultural and recreational experiences. Last year, we extended a musical invitation to San Francisco and we can do no less for Raleigh, North Carolina. So...we look forward to seeing you at the 27th ICAR where "nothing could be finer than to be in Carolina"[1], "where you can see the sunshine and feel the moonshine"[2] and "the Smoky Mountain breeze"[3]. We look forward to seeing you in Raleigh at the 27th ICAR.

1) "Carolina in the Morning" by Gus Kahn and Walter Donaldson, 1922.
2) "Carolina in My Mind" by James Taylor, 1968.
3) "Carolina Sunset" by The Marshall Tucker Band, 1984

Visit the ISAR web site.....

Visit the ISAR Web site at http://www.isar-icar.com to discover more about the 27th ICAR, such as hotel accommodations, abstract submittals, and preliminary programs. Information on the conference will be posted on the ICAR website by September 2013. If you have any questions please do not hesitate to contact the ISAR/ICAR Office at 202-973-8690 or by email at ISAR@courtesyassoc.com.

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