2017 | ACMG Annual Clinical Genetics Meeting

ACMG American College of Medical Genetics and Genomics
Translating Genes Into Health®

Closing Plenary Session: Hot Topics in Genetics: CRISPR, Synthetic Genomics and Zika Virus

Held in Phoenix, Arizona, March 21-25, 2017

Date of Release: April 3, 2017
Expiration Date: April 3, 2020 (CME, NSGC, P.A.C.E.®)
Estimate Time of Completion: 2 hours
Course must be completed by the expiration dates

COURSE DESCRIPTION

Human genetics is a rapidly developing field with many technological advances. Most recently this has included gene editing and synthetic genomes. In this session, we will discuss current hot topics in Medical genetic. Dr. David Scott from Dr. Feng Zhang's laboratory will discuss the CRISPR/Case 9 gene editing system and how it can be used for therapeutics in genetic disorders. Dr. Aravinda Chakravarti will discuss the Genome Project Write and Human Genome Project Write. This discussion will include the technologies that make this possible as well as an introduction to the ethical dilemmas. Dr. Sonja Rasmussen from the CDC will provide an update on the Zika Virus and its role as a teratogen.

LEARNING OBJECTIVES

At the conclusion of this course, participants should be able to:

- Demonstrate understanding of genome manipulation with CRISPR systems
- Describe the science, perspectives and questions of synthetic biology
- Describe the components of the congenital Zika syndrome
- Explain how synthetic genomes can help answer questions in human disease biology

TARGET AUDIENCE

All healthcare professionals interested in the diagnosis, management, treatment and prevention of genetic conditions and increasing their understanding of the genetic basis of common, chronic health problems affecting both children and adults will find the programming applicable to their practice. These select sessions from the ACMG Annual Meeting are targeted for the following professionals:

- Medical and clinical geneticists
- Physicians of all specialties with an interest in genetics, genomics and the genetic basis of disease

- Genetic counselors
- Laboratory geneticists, directors, technicians and technologists
- Researchers
- Pathologists
- Educators
- Nurses
- Dietitians
- Physician assistants
- Biotechnology and pharmaceutical development professionals
- Fellows, Trainees and Students
- Public health professionals
- Genetic/consumer advocates
- Others with an interest in the science and art of medical genetics and genomics

SESSIONS

- Implications of Human Genetic Diversity for CRISPR Genome Editing - David Scott, PhD
- Synthesizing Genomes: Challenges & Utilities - Aravinda Chakravarti, PhD
- Zika Virus: Update on a New Teratogen - Sonja Rasmussen, MD, MS

Accreditation:

The American College of Medical Genetics and Genomics is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians.

Credit Designation:
The American College of Medical Genetics and Genomics designates this activity for a maximum of 2 *AMA PRA Category 1 Credit*s™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Genetic Counselor Credit

The National Society of Genetic Counselors (NSGC) has authorized American College of Medical Genetics and Genomics to offer up to 2 Category 1 contact hours for this OnDemand course. The American Board of Genetic Counseling (ABGC) will accept CEUs earned for this course for the purposes of genetic counselor certification and recertification. Reporting of credits is sent to NSGC quarterly. Additional fee (~$25) applies for NSGC credit that is billed by NSGC.

P.A.C.E. CEUs – Laboratory Directors and Laboratory Personnel

ACMG is approved as a provider of continuing education programs in the clinical laboratory sciences by the American Society for Clinical Laboratory Science (ASCLS) Professional Acknowledgment for Continuing Education (P.A.C.E.®) Program. The American College of Medical Genetics and Genomics designates this course for a maximum of 2 contact hours. ACMG is approved by the Florida Board of Clinical Laboratory Personnel as CE Provider. ACMG is approved by the California Department of Health Services through the ASCLS P.A.C.E.® Program as CE Provider #275.

HIPAA Compliance

The ACMG supports medical information privacy. While the ACMG is not a "covered entity" under HIPAA 1996 and therefore is not required to meet these standards, ACMG wishes to take reasonable steps to ensure that the presentation of individually identifiable health information at ACMG-sponsored events has been properly authorized. All presenters have completed a form indicating whether they intend to present any form of individually

identifiable healthcare information. If so, they were asked either to attest that a HIPAA-compliant consent form is on file at their institution, or to send ACMG a copy of the ACMG HIPAA compliance form. This information is on record at the ACMG Administrative Office and will be made available on request.

Content Validation

ACMG follows the ACCME policy on Content Validation for CME activities, which requires:

Content Validation and Fair Balance

1. ACMG follows the ACCME policy on Content Validation for CME activities, which requires:
   a) All recommendations involving clinical medicine must be based on evidence that is accepted within the profession of medicine as adequate justification for their indications and contraindications in the care of patients.
   b) All scientific research referred to, reported or used in CME in support or justification of patient care recommendations must conform to the generally accepted standards of experimental design, data collection and analysis.

2. Activities that fall outside the definition of CME/CE; "Educational activities that serve to maintain, develop, or increase the knowledge, skills, and professional performance and relationships that a physician uses to provide services for patients, the public, or the profession" (source: ACCME and AMA) will not be certified for credit. CME activities that promote recommendations, treatment, or manners of practicing medicine or pharmacy that are not within the definition of CME/CE or, are known to have risks or dangers that outweigh the benefits or, are known to be ineffective in the treatment of patients.
3. Presentations and CME/CE activity materials must give a balanced view of therapeutic options; use of generic names will contribute to this impartiality. If the CME/CE educational materials or content includes trade names, where available, trade names from several companies must be used.

Off-label Uses of Products

When an off-label use of a product, or an investigational use not yet approved for any purpose, is discussed during an educational activity, the accredited sponsor shall require the speaker to disclose that the product is not labeled for the use under discussion, or that the product is still investigational. Discussions of such uses shall focus on those uses that have been subject of objective investigation.

Disclaimer: *ACMG educational programs are designed primarily as an educational tool for health care providers who wish to increase their understanding of the application of genomic technologies to patient care. The ACMG does not endorse, or recommend the use of this educational program to make patient diagnoses, particular by individuals not trained in medical genetics. Adherence to the information provided in these programs does not necessarily ensure a successful diagnostic outcome. The program should not be considered inclusive of all proper procedures and tests or exclusive of other procedures and tests that are reasonably directed at obtaining the same results. In determining the propriety of any specific procedure or test, a healthcare provider should apply his or her own professional judgment to the specific clinical circumstances presented by the individual patient or specimen.*

2017 ACMG Program and Education Committee Members Disclosures

Members of the ACMG Staff, Education and Program Committees involved in planning the 2017 ACMG Annual Clinical Genetics Meeting are required to disclose relevant relationships which could be perceived by some as a real or apparent

conflict of interest in planning. All disclosures have been reviewed and conflicts of interest resolved by the Education Committee COI sub-committee or the Executive Director and CME Associate Director and conflicts of interest are disclosed. In the cases where a conflict existed then the committee member refrained from the discussion.

Following is a list of program and education committee members who have disclosed one or more such relationships and names of companies with which those relationships exist:

EC = Education Committee; PC = Program Committee; S = ACMG Staff

1. Major stockholder/ownership interest 2. Grant/Research Support (External) 3. Salary/Employment/Royalty(ies)/Honoraria 4. Consultant/consulting fees/other remuneration 5. Speakers' bureau	6. Non-remunerative positions of influence such as officer, board member, trustee, or public spokesperson (All Committee Members Below are on ACMG Committees –Members with other affiliations are listed) 7. Receipt of intellectual property 8. Other

Georgianne L. Arnold, MD, FACMG - Horizon, 2; Recordati, 2; Biomarin, 2; Actelion, 2; SIMD, 6; ACGME, 6; AAP, 6; ASHG, 6 (PC)
Karen W. Gripp, MD, FACMG – Wiley Publishing Inc., 3; FDNA, 4; Novartis, 4 (PC)
Fuki M. Hisama, MD, FACMG – Horizon Pharmaceuticals, 4; ABMGG, 6 (PC)
Christine A. Curtis, PhD, FACMG - CSI Laboratories, 3 (EC)
Thomas E. Mullen, PhD, MS, FACMG - Good Start Genetics Inc., 3 (EC)
Christian P. Schaaf, MD, PhD, FACMG - Springer Publishing Company, 3 (PC), (EC)
Katrina M. Dipple, MD, PhD, FACMG – ACGME, 6; AAP, 6; ASHG, 6; LA BioMed DSMB, 4; SIMD 6 (PC)

Following is a list of committee, education members and staff who have no relationships to disclose:

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SPEAKERS AND MODERATORS

Faculty Disclosures:

As a sponsor accredited by the ACCME, the American College of Medical Genetics and Genomics must ensure balance, independence, objectivity and scientific rigor in all its sponsored educational activities. All faculty participating in a CME-certified activity are expected to disclose to the audience any relevant financial interest(s) or other relationship(s) with the manufacturer(s) of any commercial product(s), provider(s) of commercial services or any commercial supporters, including diagnostic laboratories, of the activity discussed in an educational presentation. Relevant financial interest(s) or other relationship(s) can include such things as grants or research

support, consultancy, major stock holder, etc. The intent of this disclosure is not to prevent a planner or speaker with a relevant financial or other relationship from course planning or making a presentation, but rather to provide learners with information on which they can make their own judgments. It remains for the audience to determine whether the speaker's interests or relationships may influence the presentation with regard to exposition or conclusion. All conflicts of interests have been reviewed and resolved by the education and CME subcommittee.

Moderator: Katrina M. Dipple, MD, PhD, FACMG
No financial relationships to disclose.

Dr. Katrina Dipple is a physician scientist who is board certified in clinical genetics and biochemical genetics. Her research interests are in disorders of fat metabolism and the genetic basis of craniofacial anomalies.

Speaker: David Scott, PhD
MIT and Broad Institute
No Financial relationships to disclose.

David Scott recently completed his PhD in the lab of Feng Zhang at MIT and the Broad Institute. During his PhD, David contributed to the development of CRISPR/Cas9 for mammalian genome editing applications as well as the creation of molecular biology, next generation sequencing (NGS), and computational techniques for unbiased genome-wide detection of CRISPR/Cas9 off-target activity. Additionally, he has worked on the discovery and functional characterization of novel CRISPR effectors as well as the development of strategies to enhance the efficiency of homology directed gene manipulation. Most recently, David has been investigating the implications of human genetic variation for the safety and efficacy of genome editing therapeutics. Prior to studying at MIT, David graduated from the University of California San Diego with a B.S. in Cognitive Science.

Speaker: Aravinda Chakravarti, PhD
Professor of Medicine, Pediatrics, Molecular Biology & Genetics, Professor of Biostatistics, Johns Hopkins University School of Medicine
No financial relationships to disclose.

Aravinda Chakravarti, Ph.D. is Professor of Medicine, Pediatrics, Molecular Biology & Genetics, and, Biostatistics at the Johns Hopkins University School of Medicine and the Bloomberg School of Public Health. He was the 2008 President of the American Society of Human Genetics, and has been elected to the US National Academy of Science, the US National Academy of Medicine, the Indian National Academy of Sciences and the Indian Academy of Sciences. He has been a key participant and architect of the Human Genome, HapMap and 1000 Genomes project. His research is aimed at genome-scale analysis of humans and computational analysis of gene variation and function to understand the molecular genetic basis of complex human disease. For his contributions to human genetics and genomics he was awarded the William Allan Award in 2013 by the American Society of Human Genetics. Aravinda Chakravarti received his doctoral degree in human genetics in 1979 and started his faculty career at the University of Pittsburgh (1980 – 1993), was the James H. Jewell Professor of Genetics at Case Western Reserve University (1994-2000), and the inaugural Director and Henry J. Knott Professor of the McKusick-Nathans Institute of Genetic Medicine at Johns Hopkins (2000-2007). He is one of the founding Editors-in-Chief of Genome Research and Annual Reviews of Genomics & Human Genetics, and serves on the boards of numerous private Institutes and charities, international journals, academic societies, the NIH and biotechnology companies.

Speaker: Sonja Rasmussen, MD, MS
Editor-in-Chief, Morbidity and Mortality Weekly Report (MMWR) Series, and Director, Division of Public Health Information Dissemination, CDC, Centers for Disease Control & Prevention
No financial relationships to disclose.

Sonja Rasmussen, MD, MS is Editor-in-Chief of CDC's Morbidity and Mortality Weekly Report (MMWR) Series and Director of the Division of Public Health Information Dissemination. Since joining CDC in 1998, Dr. Rasmussen has

held several positions in the National Center on Birth Defects and Development Disabilities including Medical Officer, Associate Director for Science, and Senior Scientist. While there, she worked collaboratively with other experts across CDC on pandemic planning efforts for pregnant women, which guided CDC recommendations for pregnant women during the 2009 H1N1 pandemic. From 2011-2014, she served as Deputy Director of the Influenza Coordination Unit, which is responsible for CDC's pandemic influenza preparedness. Before her current position, Dr. Rasmussen served for six months as the Acting Director of the Office of Public Health Preparedness and Response, the office responsible for CDC's public health preparedness and response activities, including its Emergency Operations Center. Dr. Rasmussen has played leadership roles in several CDC emergency responses to infectious diseases, including 2009 H1N1 influenza, Middle East Respiratory Syndrome (MERS) coronavirus, Ebola virus, and Zika virus. Dr. Rasmussen received her BS in Biology and Mathematics with magna cum laude honors from the University of Minnesota-Duluth, her MS degree in Medical Genetics from the University of Wisconsin, and her MD degree with honors from University of Florida. She is board certified in pediatrics and clinical genetics and is an author on over 200 peer-reviewed papers.

Participation Instructions

1. Participant logs into ondemand.acmg.net
2. Once logged in the participant will access the session they would like to view. They will be asked if they would like to claim credit for the meeting, or if they will not claim credit for the meeting. Then, this information (Course description) will appear, and participant will have to attest that they have read the information. They will then click Continue.
3. After that, the participant will be able to select the credit types to claim.
4. For each session with a post-test, the participant will need to mark and complete the matching pre-test.
5. Then the participant will watch the session presentations.
6. Participant will complete viewing all session content. "Check marks" indicate which presentations have been viewed.
7. After viewing all presentations within a session, participant will click the "Claim Credit for Session" button under the CME dropdown at the top of the page.
8. Participant should take and then successfully pass the post-test. If they do not pass with a score of 80% or higher, they will have unlimited tries to pass the post-test.
9. Participant will continue the steps above to earn credits for additional sessions.
10. If a session does not have a test attached, the participant will not need to take a pre- or posttest, but will have to complete a Concurrent or Plenary session-specific evaluation to claim credit.
11. To print their certificate, the participant will click the "Print Certificate" button under the CME dropdown at the top of the page. Participant must complete the meeting evaluation (one time only) before they can access their certificate. Participant will then choose their certificate(s). The certificate(s) will be automatically updated as they earn new credits.

Stream Requirements	
Network	For best results, use a hardwired network connection instead of wireless

Full Screen Viewing	If you would like to view the webcast full screen, display the tool bar at the bottom and click the double arrow in the far right corner. The screen will enlarge to the full screen of you system. To restore the size, press the "ESC" key
Refresh Browser Window	If the webcast freezes and does not recover in 3-4 seconds, refresh browser window
Freezing or Stuttering Issues	Adjust the amount of bandwidth needed by putting your mouse anywhere over the video window. A tool bar will appear at the bottom. On the right side you will see a "HD" button, click on that button and you will see a list of options. The top is "auto", with decreasing numbers below. Select a lower bandwidth (such as 360p) to see if your webcast improves
For Technical Support call	1-800-504-5379

Mobile Viewing Requirements

Android Devices	Android 2.3+ with Adobe Flash Player 10.2 or better installed Install Flash Player
Apple Devices	iOS 4+

Online Viewing Requirements

Bandwidth	512kbps
Required Hardware and Software	Screen resolution of 1024X768 or larger Sound card and speakers/headphones

Browser	Microsoft Internet Explorer 7.0 or better Mozilla Firefox 4 or better Safari 5 or better
Windows	Operating System: Windows 8 desktop mode, Windows 7; Windows Vista; Windows XP Service Pack 2 or 3 x86 or x64 (Browsers must be in 32-bit mode) 1.6-gigahertz (GHz) or higher processor 512MB of RAM
Mac OS	Operating System: Apple Mac OS X 10.4.8 or above Intel Core™ Duo 1.83GHz or faster processor 512MB of RAM

Registration and Fees

ondemand.acmg.net
ACMG Members and ACMG Trainees: ($50)
Non-members ($60)
Additional fee (~$25) applies for NSGC credit that is billed by NSGC.

Questions regarding CE credit should be directed to education@acmg.net.

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