



# ISGC NEWSLETTER

## ISSUE 17 - JUNE 2012

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**If you'd like to suggest a topic or article for a future newsletter, or if you'd like to give general feedback, please contact:**

**Valerie Valant**  
[valant@chgr.mgh.harvard.edu](mailto:valant@chgr.mgh.harvard.edu).

# Introduction

This is the seventeenth issue of the bi-monthly newsletter for the International Stroke Genetics Consortium. The ISGC newsletter will serve to keep investigators updated on ongoing projects, new project proposals, meetings, and publications.

The newsletter will be sent to participants on the 1st of even months (or nearest workday) as an email attachment.

All Investigators are invited and encouraged to submit content for the newsletter. Please send content suggestions to Valerie Valant ([valant@chgr.mgh.harvard.edu](mailto:valant@chgr.mgh.harvard.edu)).

# ISGC Founding Principles

Cerebrovascular disease is a complex disorder influenced by variation in many genetic and non-genetic exposures, each of which contributes only a small influence to disease risk. Therefore large (larger than any single center can assemble on its own) well-characterized samples will be necessary to discover these exposures.

## Principles of Collaboration:

- 1) The ISGC is open to all who can contribute
- 2) All contributions will be fairly recognized in publications
- 3) We work together in a spirit of cooperation and open communication in order to promote the best science in the present and the best science in the future.

# ISGC Project Updates

## New Projects

*No new project have been proposed.*

## Ongoing Projects:

### **NIH-funded ICH GWAS**

Contact: Jonathan Rosand

Date Proposed: January 2008

Aims: This multi-center genome-wide association study (GWAS) is designed to identify genetic determinants of:

- 1) Risk of intracerebral hemorrhage (ICH) using a case-control design
- 2) Clinical course of ICH using a cohort design of individuals who have suffered an ICH.

Status: Beginning to genotype warfarin related ICH cases. Meta-analysis of GOCHA and GERFHS data in all ICH and ICH subtypes (lobar and deep ICH) showed a significant association between all ICH and SNPs on chromosome 11 and several promising stacks on other chromosomes. Further investigation has shown that this region of chromosome 11 lies on an uncategorized pseudo-gene, which is also a CNV region. We are currently performing a CNV analysis in the GOCHA and GERFHS subjects as well as running Taqman replication of the top two chromosome 11 SNPs in non-genotyped samples. Exome chip genotyping will also begin March 2012 to test the rare variant risk hypothesis of ICH.

### **Looking for genetic risk factors of cervical artery dissections**

Contact: Stéphanie Debette and Didier Leys, on behalf of the CADISP group

Date Proposed: February 2009

Aims: A replication study to test whether the polymorphisms associated with CAD in the GWAS within the CADISP-consortium are also associated with CAD in other independent populations, in order to exclude spurious associations.

Status: Manuscript has been circulated to all co-authors and will be submitted shortly.

# ISGC Project Updates

## Ongoing Projects (continued):

### **The International Stroke Genetics Consortium Informatics Platform: A tool for Efficient Collaboration and Rapid Discovery**

Contacts: Steve Bevan, Jonathan Rosand

Date Proposed: February 2009

Aims: 1) Compile a publically-available web-based catalog of all clinical characteristics, radiographic studies, genetic data and available biological samples collected for subjects with ischemic stroke and controls.

2) Enrich characterization of stroke patients by classifying all subjects according to the biologically-based Causative Classification of Stroke System and creating a central repository of de-identified neuroimaging data on patients with stroke.

Status: Imaging repository function will be a part of the NINDS-ISGC collaborative U01 grant. Phenotypic and genotypic functionality to be added as a part of a BioInformatics Research Network ARRA grant.

### **National Institute of Neurological Disorders and Stroke Ischemic Stroke GWAS**

Contacts: Steven Kittner

Date Proposed: March 2009

Aims: Funding of an ischemic stroke genetics consortium in order to perform a genome wide association study in ischemic stroke patients and matched controls.

Status: Grant awarded. Project underway.

### **White Matter Hyperintensity GWAS**

Contacts: Natalia Rost, Jonathan Rosand

Date Proposed: July 2009

Aims: To discover genetic markers of WMH severity using available genome-wide data and WMH volumes measured on MRI in patients with acute ischemic stroke.

Status: Preliminary data demonstrating association between: (a) Chr 17q25 locus and WMH severity in stroke patients (Poneh Adib-Samii - PI); (b) WMH-based genetic score and incident ischemic stroke risk (Natalia Rost - PI); and (c) population-based WMH genetic risk score and risk of lacunar stroke (William Devan - PI) were submitted as abstracts to the 2012 American Neurological Association meeting.

# ISGC Project Updates

## Ongoing Projects (continued):

### **MetaStroke; A meta-analysis of genome-wide studies in ischaemic stroke**

Contact: Hugh Markus

Date Proposed: December 2009

Aims: Meta-Analysis of genome-wide data in ischemic stroke

Status: Meta-analysis underway. Additional project proposal for replication cohorts sent out to ISGC in September.

### **Genome-wide association study of deep cerebral phenotypes**

Contact: Dan Woo

Date Proposed: February 2010

Aims: (1) Specific SNPs/gene regions will be associated with deep cerebral phenotypes (deep/periventricular location of ICH, lacunar stroke or white matter disease) and this association will be independent of traditional risk factors including hypertension. (2) Specific SNPs/gene regions will be associated with deep cerebral phenotypes and will be modified by the presence/duration/severity of hypertension.

Status: List of interested studies compiled and in the process of developing a data transfer agreement. In addition, we are awaiting the completion of the Wellcome Trust effort as it would constitute a major contribution of small vessel ischemic strokes.

### **Genetics of cerebral venous thrombosis (CVT)**

Contact: Pankaj Sharma

Date Proposed: May 2010

Aims: To recruit DNA from CVT patients in order to undertake a GWAS.

Status: BEAST - a GWA study for cerebral venous thrombosis (CVT). Collaborators wish to undertake exome sequencing of DNA from subjects with cerebral venous thrombosis. The most recent teleconference (April 2012) agreed to start sending samples to the host site (Imperial College London). The first 500 cases will be genotyped around the summer of 2012.

# ISGC Project Updates

## Ongoing Projects (continued):

### **Replication of a genetic risk score for ischemic stroke based on polymorphisms associated with diabetes, BMI, cholesterol, atrial fibrillation and coronary artery disease**

Contact: Vincent Thijs

Date Proposed: May 2010

Aims: To replicate the genetic risk score for ischemic stroke that was based upon polymorphisms associated with diabetes, BMI, cholesterol, atrial fibrillation and coronary artery disease studied in a previous ISGC project proposal within a larger ISGC cohort.

Status: Collection of genotype data from collaborators underway

### **Replication of associations detected in a the Meta-stroke meta-analysis of genome-wide studies in ischaemic stroke**

Contact: Hugh Markus

Date Proposed: September 2010

Aims: Replication of findings from the initial MetaStroke collaboration in novel cohorts of Caucasian and other ethnic groups.

Status: Analysis in progress

### **Consortium of Minority Population genomewide-Association Studies of Stroke (COMPASS)**

Contact: Brad Worrall

Date Proposed: December 2010

Aims: Meta-analysis of cohorts and case-control studies with GWAS data for individuals of African descent and other minority groups.

# ISGC Project Updates

## Ongoing Projects (continued):

### **Replication of Ischemic Stroke Genes Discovered from Exome Sequencing**

Contact: Steve Rich

Date Proposed: March 2011

Aims: Replication of genes discovered in NHLBI Exome Sequencing Project in ischemic stroke cases with small or large vessel strokes.

Status: The examination of rare variants in ischemic stroke in collaboration with the NHLBI Exome Sequencing Project (ESP) has made significant progress. The ESP Executive Committee has approved the use of 3,000 case samples and 3,000 control samples to be genotyped with the ExomeChip, a custom 300,000 SNP array (as designed by Illumina) with rare variants residing in exomes and additional content. These samples will be split with WHI and the ISGC, and restricted to those samples with existing GWAS data (for imputation), deep phenotyping (for use with other targeted traits), and both cases and controls from the same sites, with IRB approval for extensive sharing of information and deposition of data into dbGaP. The two studies that had samples meeting these criteria and immediately available for shipment to the University of Washington (the ESP genotyping site for ischemic stroke) were GEOS and ISGS. These samples are being sent for evaluation with anticipated completion of genotyping in Q1 2012.

### **Genetic studies of recurrent stroke**

Contact: Brad Worrall, Michele Sale, Keith Keene

Date Proposed: February 2011

Aims: Meta-analysis and replication of GWAS in recurrent ischemic stroke.

Status: No update at this time.

### **Next Generation Sequencing in Lacunar Stroke and Small Vessel Disease**

Contact: Anna Bersano

Date Proposed: April 2011

Aims: Perform Next-Generation Sequencing on subjects with lacunar stroke and small vessel disease. Novel mutations will be replicated via direct genotyping in an additional 1000 cases and 1000 controls .

Status: No update at this time.

# ISGC Project Updates

## Ongoing Projects (continued):

### **GWA meta-analysis of carotid plaque and intima-media thickness (IMT)**

Contact: Pankaj Sharma

Date Proposed: June 2011

Aims: Meta-analysis of existing GWA data in those subjects who have had carotid imaging in order to use carotid disease as a surrogate for vascular disease.

Status: Carotid plaque and stenosis genome wide study. Collaborators intend to undertake a study on the genetics of carotid plaque in stroke patients using a meta-analysis of GWAS data. Currently, data is being imputed and phenotype information being collected from the collaborators.

### **Genome-wide Heritability of Ischemic Stroke in Caucasians.**

Contact: Braxton Mitchell

Date Proposed: August 2011

Aims: Examine the heritability of ischemic stroke using genome wide SNPs for early vs. late onset IS and determining stroke subtype

Status: No update at this time.

### **GWAS of Stroke/TIA in Patients with Atrial Fibrillation**

Contact: Mina Chung, Sudha Seshadri

Date Proposed: October 2011

Aims: Perform a GWAS meta-analysis of stroke/TIA within AF cases

Status: No update at this time.

### **Genome Wide Association Study of Plasma Fibrinogen**

Contact: Christopher O'Donnell

Date Proposed: November 2011

Aims: To conduct a meta-analysis of GWA studies on plasma levels of fibrinogen with the goal of identifying novel loci that underlie variation in plasma fibrinogen concentration.

# ISGC Project Updates

## Ongoing Projects (continued):

### Pharmacogenomics GWAS of tPA-induced Haemorrhagic Transformation

Contact: Christopher Levi

Date Proposed: November 2011

Aims: To identify SNPs associated with haemorrhagic transformation of acute ischemic stroke after intravenous tPA therapy using a pharmacogenomic-focused GWAS.

## Completed Projects:

### Wellcome Trust Case Control Consortium Ischemic Stroke GWAS

Contact: Hugh Markus

Date Proposed: July 2007

Aims: Determine whether there are genetic determinants of ischemic stroke that can be identified using GWAS and whether these determinants predispose individuals to specific subtypes of stroke.

Status: Manuscript accepted and in press at *Nature Genetics*

\*Bellenguez C, Bevan S, Gschwendtnew A, et al., on behalf of the International Stroke Genetics Consortium (ISGC) & the Wellcome Trust Case Control Consortium 2 (WTCCC2). Genome-wide association study identifies a variant in HDAC9 associated with large vessel ischemic stroke. *Nature Genetics* (in press).

### A genome-wide association study of early onset ischemic stroke

Contact: Braxton Mitchell, Steven Kittner

Date Proposed: January 2008

Aims: To carry out a GWAS of early onset stroke

- 1) Conduct a staged GWAS in the U of Maryland sample
- 2) Replicate associations detected in Aim 1 in an independent set of young-onset stroke cases controls from collaborators in the ISGC.
- 3) Determine if SNPs robustly associated with early onset stroke in both the Maryland and IGSC cohorts are also associated with older onset stroke.

Status: Manuscript in press at *G3: Genes, Genomes, Genetics*

\*Cheng Y-C, O'Connell JR, Cole, JW, Stine OC, Dueker N, McArdle PF, Sparks MJ, Shen J, Laurie CC, Nelson S, Doheny KF, Ling H, Pugh EW, Bott TG, Brown Jr. RD, Meschia JF, Nalls M, Rich SS, Worrall B, Andreson CD, Biffi A, Cortellini L, Furie KL, Rost NS, Rosand J, Manolio TA, Kittner SJ, Mitchell BD. Genome-wide association analysis of ischemic stroke in young adults. *G3: Genes, Genomes, Genetics*. 2011 Nov 1; 1(6):505-514.

# ISGC Project Updates

## Completed Projects (continued):

### **International Validation of a Computerized Algorithm for Etiologic Classification of Ischemic Stroke: The Causative Classification of Stroke System (CCS)**

Contact: Hakan Ay, Jonathan Rosand

Date Proposed: March 2008

Aims: This is an ISGC-wide study to validate a computerized system for etiologic classification of ischemic stroke.

Status: Manuscript published.

\*Arsava EM, Ballabio E, Benner T et. al.; on behalf of the International Stroke Genetics Consortium. The Causative Classification of Stroke system: An international reliability and optimization study. *Neurology*. 2010 Oct 5;75(14):1277-1284.

### **Replication of Chr. 9q21 region in stroke cases and matched controls in Chinese population**

Contacts: Xingyu Wang, Lisheng Liu

Date Proposed: March 2008

Aims: To replicate the findings of the Chromosome 9p21 projects of the ISGC within a Chinese cohort.

Status: The project has been stalled due to a lack of sample collection.

### **Relationship of genetic markers for common risk factors for stroke with ischemic cerebrovascular disease**

Contact: Vincent Thijs

Date Proposed: June 2008

Aims: Determine whether SNPs associated with well known risk factors for ischemic stroke like diabetes, elevated LDL, myocardial infarction and atrial fibrillation are associated with ischemic cerebrovascular disease using a case control design.

Status: Manuscript published.

\*Lemmens R, Buyschaert I, Geelen V, et.al. International Stroke Genetics Consortium. The Association of the 4q25 Susceptibility Variant for Atrial Fibrillation With Stroke Is Limited to Stroke of Cardioembolic Etiology. *Stroke*. 2010 Jul 29. [Epub ahead of print] PMID: 20671249.

# ISGC Project Updates

## Completed Projects (continued):

### **Chromosome 12 and risk of ischemic stroke: A replication study**

Contacts: James Meschia, Andrew Singleton, Jonathan Rosand

Date Proposed: April 2009

Aims: Replication effort through the ISGC of the CHARGE discovery of two SNPs on chromosome 12 that were over-represented among cases with ischemic stroke, compared to controls.

Status: Manuscript published.

\*International Stroke Genetics Consortium; Wellcome Trust Case-Control Consortium 2. Failure to validate association between 12p13 variants and ischemic stroke. *New England Journal of Medicine*. 2010;362(16):1547-1550.

### **Are established candidate gene polymorphisms for blood pressure, coronary heart disease, atrial fibrillation, lipid metabolism and hemostatic and inflammatory pathways also related to ischemic stroke risk in populations from the Southwest of Sweden?**

Contacts: Arne Lindgren, Christina Jern, Olle Melander

Date Proposed: July 2009

Aims: To examine if SNPs related to phenotypes are related to ischemic stroke risk in a homogenous population sample from the Southwest of Sweden.

Status: Manuscript regarding Chromosome 12p13 in press.

\*Olsson S, Melander O, Jood K, Smith JG, Lökvist H, Sjögren M, Engström G, Norrving B, Lindgren A, Jern C, the International Stroke Genetics Consortium (ISGC). A genetic variant on chromosome 12p13 does not show association to ischemic stroke in three Swedish case-control studies. *Stroke*. 2010; 42(1):214-6.

### **Genes and Response to Aspirin in Secondary Stroke Prevention, GRASSP**

Contact: Agnieszka Slowik, Joanna Pera

Date Proposed: June 2010

Aims: To establish genetic markers of aspirin efficiency, aspirin resistance, aspirin intolerance, and increased risk aspirin-related adverse effects in ischemic stroke patients with different stroke etiologies. To develop clinically useful and cost-effective test(s) allowing predict responses to aspirin treatment, and to avoid/reduce adverse effects .

Status: Grant submitted, project not funded at this time.

# ISGC Project Updates

## Completed Projects (continued):

### **Association of myocardial infarction-associated SNPs with ischemic stroke: a meta-analysis of European Caucasian populations**

Contact: Braxton Mitchell, Yu-Ching Cheng

Date Proposed: July 2010

Aims: The goal of this project is to extend previous work (e.g., the ISGC analysis of the chr 9 SNP on stroke) to determine if: (1) other MI-associated SNPs are associated with ischemic stroke; and (2) if associations of these additional SNPs are dependent on stroke subtype and/or age of stroke onset.

Status: Manuscript accepted for publication in Stroke.

\*Yu-Ching Cheng, PhD; Christopher D. Anderson, MD; Silvia Bione, PhD; Keith Keene, PhD; Jane M. Maguire PhD, RN; Michael Nalls, PhD; Asif Rasheed, MBBS; Marion Zeginigg, MSc; John Attia, PhD, MD, FRCPC, FRACP; Ross Baker, FRACP, FRCPA; Simona Barlera, MSc; Alessandro Biffi, MD; Ebony Bookman, PhD; Thomas G. Brott, MD; Robert D. Brown Jr., MD; Fang Chen, PhD; Wei-Min Chen, PhD; Emilio Ciusani, PhD; John W. Cole, MD; Lynelle Cortellini, MSc; John Danesh, FRCP; Kimberly Doheny, PhD; Luigi Ferrucci, MD, PhD; Maria Grazia Franzosi, PhD; Philippe Frossard, PhD, DSc; Karen L. Furie, MD, MPH; Jonathan Golledge, MChir, FRACS; Graeme J. Hankey, MD, FRACP, FRCP, FRCPE; Dena Hernandez, MS; Elizabeth G. Holliday, PhD; Fang-Chi Hsu, PhD; Jim Jannes, PhD, BMBS FRACP; Ayesha Kamal, MD, FAHA, ABVN; Muhammad Saleem Khan, MSc; Steven J. Kittner, MD; Simon A. Koblar, PhD, BMBS FRACP; Martin Lewis, PhD; Lisa Lincz, PhD; Antonella Lisa, PhD; Mar Matarin, PhD; Pablo Moscato, PhD; Josyf C. Mychaleckyj, DPhil; Eugenio A. Parati, MD; Silvia Parolo; Elizabeth Pugh, PhD; Natalia S. Rost, MD; Michael Schallert MSc; Helena Schmidt, MD, PhD; Rodney J. Scott, PhD, PD, FRCPath, FHGSA; Jonathan W. Sturm, PhD, MD; Sunaina Yadav, MSc; Moazzam Zaidi, MBBS; GARNET Collaborative Research Group; GENEVA Consortium; Giorgio B. Boncoraglio, MD; Christopher Royce Levi, MD, FRACP, RACP; James F. Meschia, MD; Jonathan Rosand, MD, MSc; Michele Sale, PhD; Danish Saleheen, MBBS, PhD; Reinhold Schmidt, MD; Pankaj Sharma, MD PhD FRCP; Bradford Worrall, MD, MSc; Braxton D. Mitchell, PhD; on behalf of the International Stroke Genetics Consortium

# ISGC Project Updates

## Completed Projects (continued):

### Next Generation Sequencing in Cerebral Amyloid Angiopathy

Contact: Jonathan Rosand, Lynelle Cortellini

Date Proposed: February 2011

Aims: Next-generation sequencing project aimed at identifying rare DNA sequence variants associated with CAA. Replication cohorts through the ISGC will be used in targeted sequencing and candidate gene analyses.

Status: Grant not funded at this time.

## Other Projects Involving ISGC Members

### Genetic and Environmental Risk Factors for Hemorrhagic Stroke

Contact: Daniel Woo

### Australian Stroke Genetics Collaborative Group

Contact: Chris Levi, John Attia

### NHLBI Initiative on White Matter Disease

Contact: Paul Nyquist

### INTERSTROKE

Contact: Guillaume Pare

### Mitochondrial Genetics and Risk of Stroke

Contact: Jonathan Rosand

Status: Manuscript published

### METASTROKE

Contact: Martin Dichgans

## ISGC Grants Awarded

- Wellcome Trust Genome-Wide Association Study for Ischemic Stroke (WTCCC2)
- Australian Stroke Genetics Collaborative Group
- The Baltimore-Washington Young Stroke Study (GEI)
- Gene Discovery for Warfarin-Related Intracerebral Hemorrhage (ICH GWAS)
- Ethnic/Racial Variations of Intracerebral Hemorrhage (ERICH)
- NINDS-Stroke Genetics Network (SiGN) Study

# ISGC Publications

Gschwendtner A, Bevan S, Cole JW, et.al., on behalf of the International Stroke Genetics Consortium. Sequence variants on chromosome 9p21.3 confer risk of atherosclerotic stroke. *Annals of Neurology*. 2009; 65(5): 531-539

Nalls M, Biffi A, Matarin M, et. al., on behalf of the International Stroke Genetics Consortium and the Wellcome Trust Case-Control Consortium 2. Failure to Validate Associations between Variants on Chromosome 12p13 and Stroke. *New England Journal of Medicine*. 2010; 362:1547-1550.

Lemmens R, Buyschaert I, Geelen V, et al.; International Stroke Genetics Consortium. The Association of the 4q25 Susceptibility Variant for Atrial Fibrillation With Stroke Is Limited to Stroke of Cardioembolic Etiology. *Stroke*. 2010; 41(9):1850-7 .

Arsava EM, Ballabio E, Benner T et. al.; on behalf of the International Stroke Genetics Consortium. The Causative Classification of Stroke system: An international reliability and optimization study. *Neurology*. 2010; 75(14):1277-1284.

Biffi A, Sonni A, Anderson CD, et al.; on behalf of the International Stroke Genetics Consortium. Variants at APOE Influence Risk of Deep and Lobar Intracerebral Hemorrhage. *Annals of Neurology*.. 2010; 68(6):934-43.

Anderson CD, Biffi A, Rahman R, et. al, on behalf of the International Stroke Genetics Consortium. Common mitochondrial sequence variants in ischemic stroke. *Annals of Neurology*. 2011; 69(3):471-80.

Olsson S, Melander O, Jood K, Smith JG, Lövkvist H, Sjögren M, Engström G, Norrving B, Lindgren A, Jern C, the International Stroke Genetics Consortium (ISGC). A genetic variant on chromosome 12p13 does not show association to ischemic stroke in three Swedish case-control studies. *Stroke*. 2011; 42(1):214-6 .

Biffi A, Anderson CD, Jagiella JM, et.al., on behalf of the International Stroke Genetics Consortium. APOE genotype and extent of bleeding and outcome in lobar intracerebral haemorrhage: a genetic association study. *Lancet Neurology*. 2011;10(8):702-709.

International Stroke Genetics Consortium (ISGC); Wellcome Trust Case Control Consortium 2 (WTCCC2), Bellenguez C, et al. Genome-wide association study identifies a variant in HDAC9 associated with large vessel ischemic stroke. *Nature Genetics*. 2012;44(3):328-333.

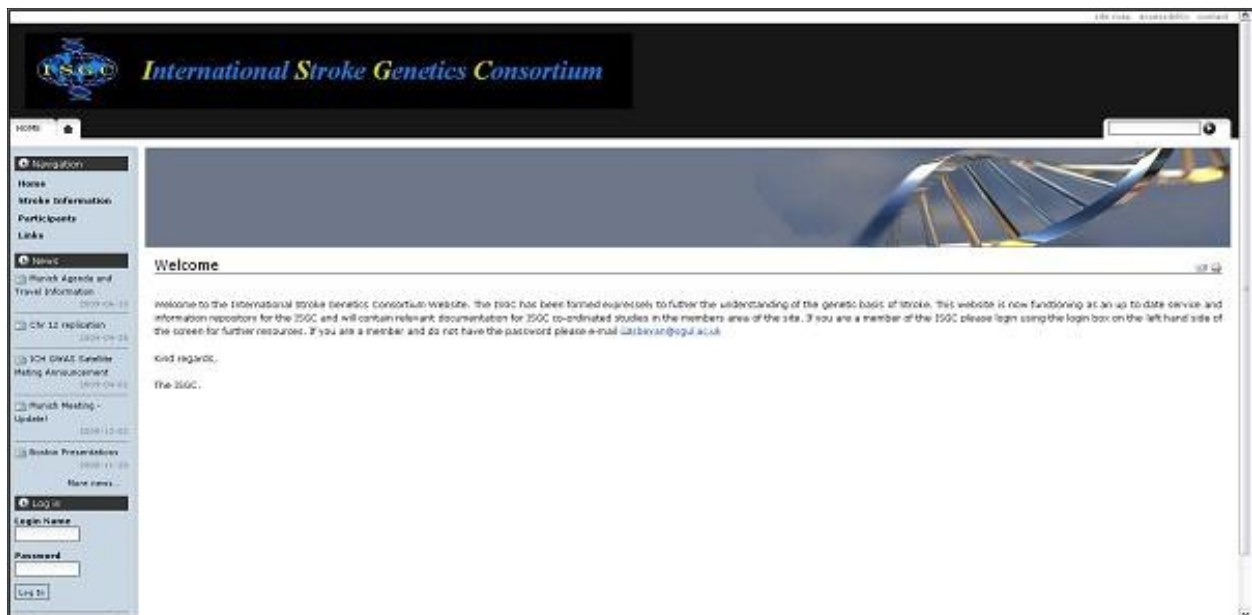
Cheng YC, Anderson CD, Bione S, et al, on behalf of the International Stroke Genetics Consortium. Are myocardial infarction—associated single-nucleotide polymorphisms associated with ischemic stroke? *Stroke*. 2012;43(4):980-986.

# Website Update

The ISGC website can be found at [www.strokegenetics.org](http://www.strokegenetics.org). Thanks to everyone who submitted a short bio and picture for the website! All bios received have been posted. If you would still like to submit a bio and picture, you can email them to Steve.

If you have additional website content or layout suggestions, please email Steve Bevan ([sbevan@sgul.ac.uk](mailto:sbevan@sgul.ac.uk)) with your ideas.

Thank you!



# Announcements

## **Congratulations to Alessandro Biffi!**

Alessandro is the recipient of The Princeton Conference's Junior Investigator award! The Junior Investigator award is given to two post-docs, fellows or assistant professors who were invited to present their work at The Princeton Conference, a bi-annual international stroke research conference. This is the first time that The Princeton Conference has granted Junior Investigator awards, and we are honored that our own Alessandro Biffi has been recognized for his work on Intracerebral Hemorrhage genetics within the ISGC. Congratulations again!

# Announcements

## **ISGC Career Development Scholarship: Winner!**

2012 Winner is Femke van't Hof from the University Medical Center of Utrecht (The Netherlands). Congratulations Femke!

# Upcoming Conference Deadlines

## 2012

### **American Neurological Association**

Abstract Deadline: N/a

Meeting Date: October 7-9, 2012

Meeting Location: Boston, MA

### **American Society of Human Genetics**

Abstract Deadline: June 4, 2012

Meeting Date: November 6-10, 2012

Meeting Location: San Francisco, CA

## 2013

### **International Stroke Conference**

Abstract Deadline: August 14, 2012

Meeting Date: February 6-9, 2013

Meeting Location: Honolulu, HI

### **American Academy of Neurology**

Abstract Deadline: TBA

Meeting Date: March 16-23, 2013

Meeting Location: San Diego, CA

### **European Stroke Conference**

Abstract Deadline: TBA

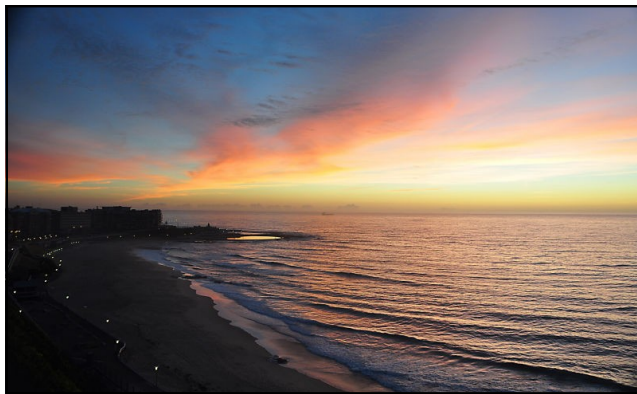
Meeting Date: TBA

Meeting Location: TBA

# 11th International Workshop: Newcastle, Australia

Thank you to Christopher Levi ([Christopher.Levi@hnehealth.nsw.gov.au](mailto:Christopher.Levi@hnehealth.nsw.gov.au)), John Attia ([John.Attia@newcastle.edu.au](mailto:John.Attia@newcastle.edu.au)), and Jane Mcguire ([Jane.Maguire@newcastle.edu.au](mailto:Jane.Maguire@newcastle.edu.au)), for putting together a successful ISGC Workshop in Newcastle!

*The 11th International Workshop of the ISGC took place on April 12-13, 2012 in Newcastle, Australia.*



# 12th International Workshop: Krakow, Poland

The 12th International Workshop of the ISGC will take place on November 15-16, 2012 in Krakow, Poland, and will be hosted by Agnieszka Słowik and Joanna Pera. Please be on the lookout for more detailed information regarding event programs and travel arrangements TBA via e-mail.

