

Supplementary Table 1 - Demographic and clinical characteristics for veterans in the MVP PAD genome-wide association study

	White		Black		Hispanic	
	PAD Cases	PAD Controls	PAD Cases	PAD Controls	PAD Cases	PAD Controls
Veterans, N	24,009	150,983	5,373	42,485	1,925	18,285
Age \pm SD, years	74.4 \pm 9.4	66.9 \pm 13.2	69.6 \pm 9.4	60.4 \pm 11.6	71.6 \pm 9.6	59.0 \pm 14.8
Male, n (%)	23,416 (97.5%)	138,753 (91.9%)	5,166 (96.1%)	36,188 (85.2%)	1,885 (97.9%)	16,400 (89.7%)
Statin Therapy Prescription, n (%)	12,351 (51.4%)	61,575 (40.8%)	3,401 (63.3%)	15,787 (37.2%)	1,340 (69.6%)	7,460 (40.8%)
Diabetes, n (%)	13,314 (55.4%)	45,307 (30.0%)	3,568 (66.4%)	16,242 (38.2%)	1,431 (74.3%)	11,943 (65.3%)
Mean Max LDL-C \pm SD, mg/dL	142.0 \pm 38.9	139.6 \pm 37.8	149.3 \pm 43.7	141.9 \pm 40.0	145.5 \pm 40.4	141.5 \pm 38.1
Former Smoker, n (%)	14,056 (58.5%)	80,809 (53.5%)	2,696 (50.1%)	17,729 (41.7%)	1,144 (59.4%)	8,660 (47.4%)
Current Smoker, n (%)	6,643 (27.7%)	25,040 (16.6%)	1,954 (36.4%)	10,988 (25.8%)	413 (21.4%)	2,788 (15.2%)
Variants Passing Quality Control	20,323,458		32,412,077		31,270,737	

Abbreviations: MVP, Million Veteran Program; PAD, Peripheral Artery Disease; SD, Standard Deviation; LDL-C, Low-Density Lipoprotein Cholesterol; mg/dL, milligrams per deciliter; Max, Maximum

Supplementary Table 3 - Odds ratios and two-sided logistic regression P values for three lead autosomal, genome-wide associated PAD variants previously reported in the literature and the lead variant and logistic regression odds ratios and two-sided P values in MVP (N = 31,307 PAD cases and 211,753 controls).

Published Lead Variant	Chr	Locus	Published OR	Published P Value	MVP Lead Variant*	MVP OR	MVP P Value	Ref
rs9584669	13	<i>IPO5/RAP2A</i>	1.72	6.8x10 ⁻¹⁴	rs9584742	1.09	0.003	4
rs6842241	4	<i>EDNRA</i>	1.18	5.3x10 ⁻⁹	rs6841581	1.07	1.9x10 ⁻⁹	4
rs10757269	9	<i>9p21</i>	NA**	2.7x10 ⁻⁹	rs1537372	1.11	2.0x10 ⁻²⁸	3

* Defined as the lead variant in MVP within a 500kB window around previously published lead variant

** Previously reported based on a GWAS of ankle-brachial index (ABI) as a continuous trait

Abbreviations: Chr, chromosome; OR, Odds Ratio; Ref, Reference; GWAS, Genome-wide Association Study; MVP, Million Veteran Program; PAD, Peripheral Artery Disease

Supplementary Table 13 - Overlap of CAD and PAD diagnoses in the 174,992 white veterans in the MVP PAD GWAS analysis

	<u>CAD Case</u>	<u>CAD Control</u>	<u>Total</u>
<u>PAD Case</u>	15,342	8,667	24,009
<u>PAD Control</u>	35,073	115,910	150,983
<u>Total</u>	50,415	124,577	174,992

Abbreviations: CAD, Coronary Artery Disease, PAD, Peripheral Artery Disease, GWAS, Genome-wide Association Study; MVP, Million Veteran Program

Supplementary Table 15 - Overlap of LAS and PAD diagnoses in the 174,992 white veterans in the MVP PAD GWAS analysis

	<u>LAS Case</u>	<u>LAS Control</u>	<u>Total</u>
<u>PAD Case</u>	519	23,490	24,009
<u>PAD Control</u>	186	150,797	150,983
<u>Total</u>	705	174,287	174,992

Abbreviations: LAS, Large Artery Stroke, PAD, Peripheral Artery Disease, GWAS, Genome-wide Association Study; MVP, Million Veteran Program

VA Million Veteran Program

MVP Executive Committee

- Co-Chair: J. Michael Gaziano, M.D., M.P.H.
- Co-Chair: Rachel Ramoni, D.M.D., Sc.D.
- Jim Breeling, M.D. (ex-officio)
- Kyong-Mi Chang, M.D.
- Grant Huang, Ph.D.
- Sumitra Muralidhar, Ph.D.
- Christopher J. O'Donnell, M.D., M.P.H.
- Philip S. Tsao, Ph.D.

MVP Program Office

- Sumitra Muralidhar, Ph.D.
- Jennifer Moser, Ph.D.

MVP Recruitment/Enrollment

- Recruitment/Enrollment Director/Deputy Director, Boston – Stacey B. Whitbourne, Ph.D.; Jessica V. Brewer, M.P.H.
- MVP Coordinating Centers
 - o Clinical Epidemiology Research Center (CERC), West Haven – John Concato, M.D., M.P.H.
 - o Cooperative Studies Program Clinical Research Pharmacy Coordinating Center, Albuquerque - Stuart Warren, J.D., Pharm D.; Dean P. Argyres, M.S.
 - o Genomics Coordinating Center, Palo Alto – Philip S. Tsao, Ph.D.
 - o Massachusetts Veterans Epidemiology Research Information Center (MAVERIC), Boston - J. Michael Gaziano, M.D., M.P.H.
 - o MVP Information Center, Canandaigua – Brady Stephens, M.S.
- Core Biorepository, Boston – Mary T. Brophy M.D., M.P.H.; Donald E. Humphries, Ph.D.
- MVP Informatics, Boston – Nhan Do, M.D.; Shahpoor Shayan
- Data Operations/Analytics, Boston – Xuan-Mai T. Nguyen, Ph.D.

MVP Science

- Genomics - Christopher J. O'Donnell, M.D., M.P.H.; Saiju Pyarajan Ph.D.; Philip S. Tsao, Ph.D.
- Phenomics - Kelly Cho, M.P.H, Ph.D.
- Data and Computational Sciences – Saiju Pyarajan, Ph.D.
- Statistical Genetics – Elizabeth Hauser, Ph.D.; Yan Sun, Ph.D.; Hongyu Zhao, Ph.D.

MVP Local Site Investigators

- Atlanta VA Medical Center (Peter Wilson)
1670 Clairmont Rd, Decatur, GA 30033
- Bay Pines VA Healthcare System (Rachel McArdle)
10,000 Bay Pines Blvd Bay Pines FL 33744
- Birmingham VA Medical Center (Louis Dellitalia)
700 S. 19th Street Birmingham AL 35233
- Cincinnati VA Medical Center (John Harley)
3200 Vine Street, Cincinnati, OH 45220
- Clement J. Zablocki VA Medical Center (Jeffrey Whittle)
5000 West National Avenue, Milwaukee, WI 53295
- Durham VA Medical Center (Jean Beckham)
508 Fulton Street Durham, NC 27705
- Edith Nourse Rogers Memorial Veterans Hospital (John Wells)
200 Springs Road, Bedford, MA 01730
- Edward Hines, Jr. VA Medical Center (Salvador Gutierrez)
5000 South 5th Avenue, Hines, IL 60141
- Fayetteville VA Medical Center (Gretchen Gibson)
1100 N College Ave, Fayetteville, AR 72703
- VA Health Care Upstate New York (Laurence Kaminsky)
113 Holland Avenue Albany NY 12208
- New Mexico VA Health Care System (Gerardo Villareal)
1501 San Pedro Drive, S.E.Albuquerque, NM 87108
- VA Boston Healthcare System (Scott Kinlay)
150 S. Huntington Avenue, Boston, MA 02130
- VA Western New York Healthcare System (Junzhe Xu)
3495 Bailey Avenue Buffalo, NY 14215-1199
- Ralph H. Johnson VA Medical Center (Mark Hamner)
109 Bee Street, Mental Health Research, Charleston, SC 29401
- Wm. Jennings Bryan Dorn VA Medical Center (Kathlyn Sue Haddock)
6439 Garners Ferry Road, Columbia, SC 29209
- VA North Texas Health Care System (Sujata Bhushan)
4500 S. LANCASTER ROAD, DALLAS, TX 75216
- Hampton VA Medical Center (Pran Iruvanti)
100 Emancipation Drive, Hampton, VA 23667
- Hunter Holmes McGuire VA Medical Center (Michael Godschalk)
1201 Broad Rock Blvd., Richmond, VA 23249
- Iowa City VA Health Care System (Zuhair Ballas)
601 Highway 6 West, Iowa City, IA 52246-2208

- Jack C. Montgomery VA Medical Center (Malcolm Buford)
1011 Honor Heights Dr., Muskogee, OK 74401
- James A. Haley Veterans' Hospital (Stephen Mastorides)
13000 Bruce B. Downs Blvd., Tampa, FL 33612
- Louisville VA Medical Center (Jon Klein)
800 Zorn Avenue, Louisville, KY 40206

- Manchester VA Medical Center (Nora Ratcliffe)
718 Smyth Road, Manchester, NH 03104
- Miami VA Health Care System (Hermes Florez)
1201 NW 16th Street, 11 GRC, Miami FL 33125
- Michael E. DeBakey VA Medical Center (Alan Swann)
2002 Holcombe Blvd. Houston TX 77030
- Minneapolis VA Health Care System (Maureen Murdoch)
One Veterans Drive Minneapolis MN 55417
- N. FL/S. GA Veterans Health System (Peruvemba Sriram)
1601 SW Archer Road, Gainesville, FL 32608
- Northport VA Medical Center (Shing Shing Yeh)
79 Middleville Road, Northport, NY 11768
- Overton Brooks VA Medical Center (Ronald Washburn)
510 East Stoner Ave, Shreveport, LA 71101
- Philadelphia VA Medical Center (Darshana Jhala)
3900 Woodland Avenue, Philadelphia, PA 19104
- Phoenix VA Health Care System (Samuel Aguayo)
650 E. Indian School Road, Phoenix, AZ 85012
- Portland VA Medical Center (David Cohen)
3710 SW U.S. Veterans Hospital Road, Portland, OR 97239
- Providence VA Medical Center (Satish Sharma)
830 Chalkstone Avenue, Providence, RI 02908
- Richard Roudebush VA Medical Center (John Callaghan)
1481 West 10th Street, Indianapolis, IN 46202
- Salem VA Medical Center (Kris Ann Oursler)
1970 Roanoke Blvd., Salem, VA 24153
- San Francisco VA Health Care System (Mary Whooley)
4150 Clement Street, San Francisco, CA 94121
- South Texas Veterans Health Care System (Sunil Ahuja)
7400 Merton Minter Boulevard, San Antonio, TX 78229
- Southeast Louisiana Veterans Health Care System (Amparo Gutierrez)
2400 Canal Street, New Orleans, LA 70119
- Southern Arizona VA Health Care System (Ronald Schiffman)
3601 S 6th Ave, Tucson, AZ 85723
- Sioux Falls VA Health Care System (Jennifer Greco)
2501 W 22nd St, Sioux Falls, SD 57105
- St. Louis VA Health Care System (Michael Rauchman)
915 North Grand Blvd., St. Louis, MO 63106
- Syracuse VA Medical Center (Richard Servatius)
800 Irving Avenue, Syracuse, NY 13210
- VA Eastern Kansas Health Care System (Mary Oehlert)
4101 S 4th Street Trafficway, Leavenworth, KS 66048
- VA Greater Los Angeles Health Care System (Agnes Wallbom)
11301 Wilshire Blvd Los Angeles, CA 90073
- VA Loma Linda Healthcare System (Ronald Fernando)

- 11201 Benton Street, Loma Linda, CA 92357
- VA Long Beach Healthcare System (Timothy Morgan)
5901 East 7th Street Long Beach CA 90822
- VA Maine Healthcare System (Todd Stapley)
1 VA Center, Augusta, ME 04330
- VA New York Harbor Healthcare System (Scott Sherman)
423 East 23rd Street New York, NY 10010
- VA Pacific Islands Health Care System (Gwenevere Anderson)
459 Patterson Rd, Honolulu, HI 96819
- VA Palo Alto Health Care System (Philip Tsao)
3801 Miranda Avenue Palo Alto, CA 94304-1290
- VA Pittsburgh Health Care System (Elif Sonel)
University Drive, Pittsburgh, PA 15240
- VA Puget Sound Health Care System (Edward Boyko)
1660 S. Columbian Way Seattle, WA 98108-1597
- VA Salt Lake City Health Care System (Laurence Meyer)
500 Foothill Drive Salt Lake City, UT 84148
- VA San Diego Healthcare System (Samir Gupta)
3350 La Jolla Village Drive, San Diego, CA 92161
- VA Southern Nevada Healthcare System (Joseph Fayad)
6900 North Pecos Road, North Las Vegas, NV 89086
- VA Tennessee Valley Healthcare System (Adriana Hung)
1310 24th Ave. South Nashville, TN 37212
- Washington DC VA Medical Center (Jack Lichy)
50 Irving St, Washington, D. C. 20422
- W.G. (Bill) Hefner VA Medical Center (Robin Hurley)
1601 Brenner Ave, Salisbury, NC 28144
- White River Junction VA Medical Center (Brooks Robey)
163 Veterans Drive, White River Junction, VT 05009
- William S. Middleton Memorial Veterans Hospital (Robert Striker)
2500 Overlook Terrace, Madison, WI 53705

MEGASTROKE CONSORTIUM

Rainer Malik¹, Ganesh Chauhan², Matthew Traylor³, Muralidharan Sargurupremraj^{4,5}, Yukinori Okada^{6,7,8}, Aniket Mishra^{4,5}, Loes Rutten-Jacobs³, Anne-Katrin Giese⁹, Sander W van der Laan¹⁰, Solveig Gretarsdottir¹¹, Christopher D Anderson^{12,13,14,14}, Michael Chong¹⁵, Hieab HH Adams^{16,17}, Tetsuro Ago¹⁸, Peter Almgren¹⁹, Philippe Amouyel^{20,21}, Hakan Ay^{22,13}, Traci M Bartz²³, Oscar R Benavente²⁴, Steve Bevan²⁵, Giorgio B Boncoraglio²⁶, Robert D Brown, Jr.²⁷, Adam S Butterworth^{28,29}, Caty Carrera^{30,31}, Cara L Carty^{32,33}, Daniel I Chasman^{34,35}, Wei-Min Chen³⁶, John W Cole³⁷, Adolfo Correa³⁸, Ioana Cotlarciuc³⁹, Carlos Cruchaga^{40,41}, John Danesh^{28,42,43,44}, Paul IW de Bakker^{45,46}, Anita L DeStefano^{47,48}, Marcel den Hoed⁴⁹, Qing Duan⁵⁰, Stefan T Engelter^{51,52}, Guido J Falcone^{53,54}, Rebecca F Gottesman⁵⁵, Raji P Grewal⁵⁶, Vilmundur Gudnason^{57,58}, Stefan Gustafsson⁵⁹, Jeffrey Haessler⁶⁰, Tamara B Harris⁶¹, Ahamad Hassan⁶², Aki S Havulinna^{63,64}, Susan R Heckbert⁶⁵, Elizabeth G Holliday^{66,67}, George Howard⁶⁸, Fang-Chi Hsu⁶⁹, Hyacinth I Hyacinth⁷⁰, M Arfan Ikram¹⁶, Erik Ingelsson^{71,72}, Marguerite R Irvin⁷³, Xueqiu Jian⁷⁴, Jordi Jiménez-Conde⁷⁵, Julie A Johnson^{76,77}, J Wouter Jukema⁷⁸, Masahiro Kanai^{6,7,79}, Keith L Keene^{80,81}, Brett M Kissela⁸², Dawn O Kleindorfer⁸², Charles Kooperberg⁶⁰, Michiaki Kubo⁸³, Leslie A Lange⁸⁴, Carl D Langefeld⁸⁵, Claudia Langenberg⁸⁶, Lenore J Launer⁸⁷, Jin-Moo Lee⁸⁸, Robin Lemmens^{89,90}, Didier Leys⁹¹, Cathryn M Lewis^{92,93}, Wei-Yu Lin^{28,94}, Arne G Lindgren^{95,96}, Erik Lorentzen⁹⁷, Patrik K Magnusson⁹⁸, Jane Maguire⁹⁹, Ani Manichaikul³⁶, Patrick F McArdle¹⁰⁰, James F Meschia¹⁰¹, Braxton D Mitchell^{100,102}, Thomas H Mosley^{103,104}, Michael A Nalls^{105,106}, Toshiharu Ninomiya¹⁰⁷, Martin J O'Donnell^{15,108}, Bruce M Psaty^{109,110,111,112}, Sara L Pulit^{113,45}, Kristiina Rannikmäe^{114,115}, Alexander P Reiner^{65,116}, Kathryn M Rexrode¹¹⁷, Kenneth Rice¹¹⁸, Stephen S Rich³⁶, Paul M Ridker^{34,35}, Natalia S Rost^{9,13}, Peter M Rothwell¹¹⁹, Jerome I Rotter^{120,121}, Tatjana Rundek¹²², Ralph L Sacco¹²², Saori Sakaue^{7,123}, Michele M Sale¹²⁴, Veikko Salomaa⁶³, Bishwa R Sapkota¹²⁵, Reinhold Schmidt¹²⁶, Carsten O Schmidt¹²⁷, Ulf Schminke¹²⁸, Pankaj Sharma³⁹, Agnieszka Slowik¹²⁹, Cathie LM Sudlow^{114,115}, Christian Tanislav¹³⁰, Turgut Tatlisumak^{131,132}, Kent D Taylor^{120,121}, Vincent NS Thijs^{133,134}, Gudmar Thorleifsson¹¹, Unnur Thorsteinsdottir¹¹, Steffen Tiedt¹, Stella Trompet¹³⁵, Christophe Tzourio^{5,136,137}, Cornelia M van Duijn^{138,139}, Matthew Walters¹⁴⁰, Nicholas J Wareham⁸⁶, Sylvia Wassertheil-Smoller¹⁴¹, James G Wilson¹⁴², Kerri L Wiggins¹⁰⁹, Qiong Yang⁴⁷, Salim Yusuf¹⁵, Najaf Amin¹⁶, Hugo S Aparicio^{185,48}, Donna K Arnett¹⁸⁶, John Attia¹⁸⁷, Alexa S Beiser^{47,48}, Claudine Berr¹⁸⁸, Julie E Buring^{34,35}, Mariana Bustamante¹⁸⁹, Valeria Caso¹⁹⁰, Yu-Ching Cheng¹⁹¹, Seung Hoan Choi^{192,48}, Ayesha Chowhan^{185,48}, Natalia Cullell³¹, Jean-François Dartigues^{193,194}, Hossein Delavaran^{95,96}, Pilar Delgado¹⁹⁵, Marcus Dörr^{196,197}, Gunnar Engström¹⁹, Ian Ford¹⁹⁸, Wander S Gurpreet¹⁹⁹, Anders Hamsten^{200,201}, Laura Heitsch²⁰², Atsushi Hozawa²⁰³, Laura Ibanez²⁰⁴, Andreea Ilinca^{95,96}, Martin Ingelsson²⁰⁵, Motoki Iwasaki²⁰⁶, Rebecca D Jackson²⁰⁷, Katarina Jood²⁰⁸, Pekka Jousilahti⁶³, Sara Kaffashian^{4,5}, Lalit Kalra²⁰⁹, Masahiro Kamouchi²¹⁰, Takanari Kitazono²¹¹, Olafur Kjartansson²¹², Manja Kloss²¹³, Peter J Koudstaal²¹⁴, Jerzy Krupinski²¹⁵, Daniel L Labovitz²¹⁶, Cathy C Laurie¹¹⁸, Christopher R Levi²¹⁷, Linxin Li²¹⁸, Lars Lind²¹⁹, Cecilia M Lindgren^{220,221}, Vasileios Lioutas^{222,48}, Yong Mei Liu²²³, Oscar L Lopez²²⁴, Hirata Makoto²²⁵, Nicolas Martinez-Majander¹⁷², Koichi Matsuda²²⁵, Naoko Minegishi²⁰³, Joan Montaner²²⁶, Andrew P Morris^{227,228}, Elena Muiño³¹, Martina Müller-Nurasyid^{229,230,231}, Bo Norrving^{95,96}, Soichi Ogishima²⁰³, Eugenio A Parati²³², Leema Reddy Peddareddygar⁵⁶, Nancy L Pedersen^{98,233}, Joanna Pera¹²⁹, Markus Perola^{63,234}, Alessandro Pezzini²³⁵, Silvana Pileggi²³⁶, Raquel Rabionet²³⁷, Iolanda Riba-Llena³⁰, Marta Ribasés²³⁸, Jose R Romero^{185,48}, Jaime Roquer^{239,240}, Anthony G Rudd^{241,242}, Antti-Pekka Sarin^{243,244}, Ralhan Sarju¹⁹⁹, Chloe Sarnowski^{47,48}, Makoto Sasaki²⁴⁵, Claudia L Satizabal^{185,48}, Mamoru Satoh²⁴⁵, Naveed

Sattar²⁴⁶, Norie Sawada²⁰⁶, Gerli Sibolt¹⁷², Ásgeir Sigurdsson²⁴⁷, Albert Smith²⁴⁸, Kenji Sobue²⁴⁵, Carolina Soriano-Tárraga²⁴⁰, Tara Stanne²⁴⁹, O Colin Stine²⁵⁰, David J Stott²⁵¹, Konstantin Strauch^{229,252}, Takako Takai²⁰³, Hideo Tanaka^{253,254}, Kozo Tanno²⁴⁵, Alexander Teumer²⁵⁵, Liisa Tomppo¹⁷², Nuria P Torres-Aguila³¹, Emmanuel Touze^{256,257}, Shoichiro Tsugane²⁰⁶, Andre G Uitterlinden²⁵⁸, Einar M Valdimarsson²⁵⁹, Sven J van der Lee¹⁶, Henry Völzke²⁵⁵, Kenji Wakai²⁵³, David Weir²⁶⁰, Stephen R Williams²⁶¹, Charles DA Wolfe^{241,242}, Quenna Wong¹¹⁸, Huichun Xu¹⁹¹, Taiki Yamaji²⁰⁶, Dharambir K Sanghera^{125,169,170}, Olle Melander¹⁹, Christina Jern¹⁷¹, Daniel Strbian^{172,173}, Israel Fernandez-Cadenas^{31,30}, W T Longstreth, Jr^{174,65}, Arndt Rolfs¹⁷⁵, Jun Hata¹⁰⁷, Daniel Woo⁸², Jonathan Rosand^{12,13,14}, Guillaume Pare¹⁵, Jemma C Hopewell¹⁷⁶, Danish Saleheen¹⁷⁷, Kari Stefansson^{11,178}, Bradford B Worrall¹⁷⁹, Steven J Kittner³⁷, Sudha Seshadri^{180,48}, Myriam Fornage^{74,181}, Hugh S Markus³, Joanna MM Howson²⁸, Yoichiro Kamatani^{6,182}, Stephanie Debette^{4,5}, Martin Dichgans^{1,183,184}

- 1 Institute for Stroke and Dementia Research (ISD), University Hospital, LMU Munich, Munich, Germany
- 2 Centre for Brain Research, Indian Institute of Science, Bangalore, India
- 3 Stroke Research Group, Division of Clinical Neurosciences, University of Cambridge, UK
- 4 INSERM U1219 Bordeaux Population Health Research Center, Bordeaux, France
- 5 University of Bordeaux, Bordeaux, France
- 6 Laboratory for Statistical Analysis, RIKEN Center for Integrative Medical Sciences, Yokohama, Japan
- 7 Department of Statistical Genetics, Osaka University Graduate School of Medicine, Osaka, Japan
- 8 Laboratory of Statistical Immunology, Immunology Frontier Research Center (WPI-IFReC), Osaka University, Suita, Japan.
- 9 Department of Neurology, Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA
- 10 Laboratory of Experimental Cardiology, Division of Heart and Lungs, University Medical Center Utrecht, University of Utrecht, Utrecht, Netherlands
- 11 deCODE genetics/AMGEN inc, Reykjavik, Iceland
- 12 Center for Genomic Medicine, Massachusetts General Hospital (MGH), Boston, MA, USA
- 13 J. Philip Kistler Stroke Research Center, Department of Neurology, MGH, Boston, MA, USA
- 14 Program in Medical and Population Genetics, Broad Institute, Cambridge, MA, USA
- 15 Population Health Research Institute, McMaster University, Hamilton, Canada
- 16 Department of Epidemiology, Erasmus University Medical Center, Rotterdam, Netherlands
- 17 Department of Radiology and Nuclear Medicine, Erasmus University Medical Center, Rotterdam, Netherlands
- 18 Department of Medicine and Clinical Science, Graduate School of Medical Sciences, Kyushu University, Fukuoka, Japan
- 19 Department of Clinical Sciences, Lund University, Malmö, Sweden
- 20 Univ. Lille, Inserm, Institut Pasteur de Lille, LabEx DISTALZ-UMR1167, Risk factors and molecular determinants of aging-related diseases, F-59000 Lille, France
- 21 Centre Hosp. Univ Lille, Epidemiology and Public Health Department, F-59000 Lille, France
- 22 AA Martinos Center for Biomedical Imaging, Department of Radiology, Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA
- 23 Cardiovascular Health Research Unit, Departments of Biostatistics and Medicine, University of Washington, Seattle, WA, USA
- 24 Division of Neurology, Faculty of Medicine, Brain Research Center, University of British Columbia, Vancouver, Canada
- 25 School of Life Science, University of Lincoln, Lincoln, UK

26 Department of Cerebrovascular Diseases, Fondazione IRCCS Istituto Neurologico "Carlo Besta", Milano, Italy

27 Department of Neurology, Mayo Clinic Rochester, Rochester, MN, USA

28 MRC/BHF Cardiovascular Epidemiology Unit, Department of Public Health and Primary Care, University of Cambridge, Cambridge, UK

29 The National Institute for Health Research Blood and Transplant Research Unit in Donor Health and Genomics, University of Cambridge, UK

30 Neurovascular Research Laboratory, Vall d'Hebron Institut of Research, Neurology and Medicine Departments-Universitat Autònoma de Barcelona, Vall d'Hebrón Hospital, Barcelona, Spain

31 Stroke Pharmacogenomics and Genetics, Fundacio Docència i Recerca MutuaTerrassa, Terrassa, Spain

32 Children's Research Institute, Children's National Medical Center, Washington, DC, USA

33 Center for Translational Science, George Washington University, Washington, DC, USA

34 Division of Preventive Medicine, Brigham and Women's Hospital, Boston, MA, USA

35 Harvard Medical School, Boston, MA, USA

36 Center for Public Health Genomics, Department of Public Health Sciences, University of Virginia, Charlottesville, VA, USA

37 Department of Neurology, University of Maryland School of Medicine and Baltimore VAMC, Baltimore, MD, USA

38 Departments of Medicine, Pediatrics and Population Health Science, University of Mississippi Medical Center, Jackson, MS, USA

39 Institute of Cardiovascular Research, Royal Holloway University of London, UK & Ashford and St Peters Hospital, Surrey UK

40 Department of Psychiatry, The Hope Center Program on Protein Aggregation and Neurodegeneration (HPAN), Washington University, School of Medicine, St. Louis, MO, USA

41 Department of Developmental Biology, Washington University School of Medicine, St. Louis, MO, USA

42 NIHR Blood and Transplant Research Unit in Donor Health and Genomics, Department of Public Health and Primary Care, University of Cambridge, Cambridge, UK

43 Wellcome Trust Sanger Institute, Wellcome Trust Genome Campus, Hinxton, Cambridge, UK

44 British Heart Foundation, Cambridge Centre of Excellence, Department of Medicine, University of Cambridge, Cambridge, UK

45 Department of Medical Genetics, University Medical Center Utrecht, Utrecht, Netherlands

46 Department of Epidemiology, Julius Center for Health Sciences and Primary Care, University Medical Center Utrecht, Utrecht, Netherlands

47 Boston University School of Public Health, Boston, MA, USA

48 Framingham Heart Study, Framingham, MA, USA

49 Department of Immunology, Genetics and Pathology and Science for Life Laboratory, Uppsala University, Uppsala, Sweden

50 Department of Genetics, University of North Carolina, Chapel Hill, NC, USA

51 Department of Neurology and Stroke Center, Basel University Hospital, Switzerland

52 Neurorehabilitation Unit, University and University Center for Medicine of Aging and Rehabilitation Basel, Felix Platter Hospital, Basel, Switzerland

53 Department of Neurology, Yale University School of Medicine, New Haven, CT, USA

54 Program in Medical and Population Genetics, The Broad Institute of Harvard and MIT, Cambridge, MA, USA

55 Department of Neurology, Johns Hopkins University School of Medicine, Baltimore, MD, USA

56 Neuroscience Institute, SF Medical Center, Trenton, NJ, USA

57 Icelandic Heart Association Research Institute, Kopavogur, Iceland

58 University of Iceland, Faculty of Medicine, Reykjavik, Iceland

59 Department of Medical Sciences, Molecular Epidemiology and Science for Life Laboratory, Uppsala University, Uppsala, Sweden

60 Division of Public Health Sciences, Fred Hutchinson Cancer Research Center, Seattle, WA, USA

61 Laboratory of Epidemiology and Population Science, National Institute on Aging, National Institutes of Health, Bethesda, MD, USA

62 Department of Neurology, Leeds General Infirmary, Leeds Teaching Hospitals NHS Trust, Leeds, UK

63 National Institute for Health and Welfare, Helsinki, Finland

64 FIMM - Institute for Molecular Medicine Finland, Helsinki, Finland

65 Department of Epidemiology, University of Washington, Seattle, WA, USA

66 Public Health Stream, Hunter Medical Research Institute, New Lambton, Australia

67 Faculty of Health and Medicine, University of Newcastle, Newcastle, Australia

68 School of Public Health, University of Alabama at Birmingham, Birmingham, AL, USA

69 Department of Biostatistical Sciences, Wake Forest School of Medicine, Winston-Salem, NC, USA

70 Aflac Cancer and Blood Disorder Center, Department of Pediatrics, Emory University School of Medicine, Atlanta, GA, USA

71 Department of Medicine, Division of Cardiovascular Medicine, Stanford University School of Medicine, CA, USA

72 Department of Medical Sciences, Molecular Epidemiology and Science for Life Laboratory, Uppsala University, Uppsala, Sweden

73 Epidemiology, School of Public Health, University of Alabama at Birmingham, USA

74 Brown Foundation Institute of Molecular Medicine, University of Texas Health Science Center at Houston, Houston, TX, USA

75 Neurovascular Research Group (NEUVAS), Neurology Department, Institut Hospital del Mar d'Investigació Mèdica, Universitat Autònoma de Barcelona, Barcelona, Spain

76 Department of Pharmacotherapy and Translational Research and Center for Pharmacogenomics, University of Florida, College of Pharmacy, Gainesville, FL, USA

77 Division of Cardiovascular Medicine, College of Medicine, University of Florida, Gainesville, FL, USA

78 Department of Cardiology, Leiden University Medical Center, Leiden, the Netherlands

79 Program in Bioinformatics and Integrative Genomics, Harvard Medical School, Boston, MA, USA

80 Department of Biology, East Carolina University, Greenville, NC, USA

81 Center for Health Disparities, East Carolina University, Greenville, NC, USA

82 University of Cincinnati College of Medicine, Cincinnati, OH, USA

83 RIKEN Center for Integrative Medical Sciences, Yokohama, Japan

84 Department of Medicine, University of Colorado Denver, Anschutz Medical Campus, Aurora, CO, USA

85 Center for Public Health Genomics and Department of Biostatistical Sciences, Wake Forest School of Medicine, Winston-Salem, NC, USA

86 MRC Epidemiology Unit, University of Cambridge School of Clinical Medicine, Institute of Metabolic Science, Cambridge Biomedical Campus, Cambridge, UK

87 Intramural Research Program, National Institute on Aging, National Institutes of Health, Bethesda, MD, USA

88 Department of Neurology, Radiology, and Biomedical Engineering, Washington University School of Medicine, St. Louis, MO, USA

89 KU Leuven – University of Leuven, Department of Neurosciences, Experimental Neurology, Leuven, Belgium

90 VIB Center for Brain & Disease Research, University Hospitals Leuven, Department of Neurology, Leuven, Belgium

91 Univ.-Lille, INSERM U 1171. CHU Lille. Lille, France

92 Department of Medical and Molecular Genetics, King's College London, London, UK

93 SGDP Centre, Institute of Psychiatry, Psychology & Neuroscience, King's College London, London, UK

94 Northern Institute for Cancer Research, Paul O'Gorman Building, Newcastle University, Newcastle, UK

95 Department of Clinical Sciences Lund, Neurology, Lund University, Lund, Sweden

96 Department of Neurology and Rehabilitation Medicine, Skåne University Hospital, Lund, Sweden

97 Bioinformatics Core Facility, University of Gothenburg, Gothenburg, Sweden

98 Department of Medical Epidemiology and Biostatistics, Karolinska Institutet, Stockholm, Sweden

99 University of Technology Sydney, Faculty of Health, Ultimo, Australia

100 Department of Medicine, University of Maryland School of Medicine, MD, USA

101 Department of Neurology, Mayo Clinic, Jacksonville, FL, USA

102 Geriatrics Research and Education Clinical Center, Baltimore Veterans Administration Medical Center, Baltimore, MD, USA

103 Division of Geriatrics, School of Medicine, University of Mississippi Medical Center, Jackson, MS, USA

104 Memory Impairment and Neurodegenerative Dementia Center, University of Mississippi Medical Center, Jackson, MS, USA

105 Laboratory of Neurogenetics, National Institute on Aging, National Institutes of Health, Bethesda, MD, USA

106 Data Tecnica International, Glen Echo MD, USA

107 Department of Epidemiology and Public Health, Graduate School of Medical Sciences, Kyushu University, Fukuoka, Japan

108 Clinical Research Facility, Department of Medicine, NUI Galway, Galway, Ireland

109 Cardiovascular Health Research Unit, Department of Medicine, University of Washington, Seattle, WA, USA

110 Department of Epidemiology, University of Washington, Seattle, WA

111 Department of Health Services, University of Washington, Seattle, WA, USA

112 Kaiser Permanente Washington Health Research Institute, Seattle, WA, USA

113 Brain Center Rudolf Magnus, Department of Neurology, University Medical Center Utrecht, Utrecht, The Netherlands

114 Usher Institute of Population Health Sciences and Informatics, University of Edinburgh, Edinburgh, UK

115 Centre for Clinical Brain Sciences, University of Edinburgh, Edinburgh, UK

116 Fred Hutchinson Cancer Research Center, University of Washington, Seattle, WA, USA

117 Department of Medicine, Brigham and Women's Hospital, Boston, MA, USA

118 Department of Biostatistics, University of Washington, Seattle, WA, USA

119 Nuffield Department of Clinical Neurosciences, University of Oxford, UK

120 Institute for Translational Genomics and Population Sciences, Los Angeles Biomedical Research Institute at Harbor-UCLA Medical Center, Torrance, CA, USA

121 Division of Genomic Outcomes, Department of Pediatrics, Harbor-UCLA Medical Center, Torrance, CA, USA

122 Department of Neurology, Miller School of Medicine, University of Miami, Miami, FL, USA

123 Department of Allergy and Rheumatology, Graduate School of Medicine, the University of Tokyo, Tokyo, Japan

124 Center for Public Health Genomics, University of Virginia, Charlottesville, VA, USA

125 Department of Pediatrics, College of Medicine, University of Oklahoma Health Sciences Center, Oklahoma City, OK, USA

126 Department of Neurology, Medical University of Graz, Graz, Austria

127 University Medicine Greifswald, Institute for Community Medicine, SHIP-KEF, Greifswald, Germany

128 University Medicine Greifswald, Department of Neurology, Greifswald, Germany

129 Department of Neurology, Jagiellonian University, Krakow, Poland
130 Department of Neurology, Justus Liebig University, Giessen, Germany
131 Department of Clinical Neurosciences/Neurology, Institute of Neuroscience and Physiology, Sahlgrenska Academy at University of Gothenburg, Gothenburg, Sweden
132 Sahlgrenska University Hospital, Gothenburg, Sweden
133 Stroke Division, Florey Institute of Neuroscience and Mental Health, University of Melbourne, Heidelberg, Australia
134 Austin Health, Department of Neurology, Heidelberg, Australia
135 Department of Internal Medicine, Section Gerontology and Geriatrics, Leiden University Medical Center, Leiden, the Netherlands
136 INSERM U1219, Bordeaux, France
137 Department of Public Health, Bordeaux University Hospital, Bordeaux, France
138 Genetic Epidemiology Unit, Department of Epidemiology, Erasmus University Medical Center Rotterdam, Netherlands
139 Center for Medical Systems Biology, Leiden, Netherlands
140 School of Medicine, Dentistry and Nursing at the University of Glasgow, Glasgow, UK
141 Department of Epidemiology and Population Health, Albert Einstein College of Medicine, NY, USA
142 Department of Physiology and Biophysics, University of Mississippi Medical Center, Jackson, MS, USA
143 A full list of members and affiliations appears in the Supplementary Note
144 Department of Human Genetics, McGill University, Montreal, Canada
145 Department of Pathophysiology, Institute of Biomedicine and Translation Medicine, University of Tartu, Tartu, Estonia
146 Department of Cardiac Surgery, Tartu University Hospital, Tartu, Estonia
147 Clinical Gene Networks AB, Stockholm, Sweden
148 Department of Genetics and Genomic Sciences, The Icahn Institute for Genomics and Multiscale Biology Icahn School of Medicine at Mount Sinai, New York, NY, USA
149 Department of Pathophysiology, Institute of Biomedicine and Translation Medicine, University of Tartu, Biomedikum, Tartu, Estonia
150 Integrated Cardio Metabolic Centre, Department of Medicine, Karolinska Institutet, Karolinska Universitetssjukhuset, Huddinge, Sweden.
151 Clinical Gene Networks AB, Stockholm, Sweden
152 Sorbonne Universités, UPMC Univ. Paris 06, INSERM, UMR_S 1166, Team Genomics & Pathophysiology of Cardiovascular Diseases, Paris, France
153 ICAN Institute for Cardiometabolism and Nutrition, Paris, France
154 Department of Biomedical Engineering, University of Virginia, Charlottesville, VA, USA
155 Group Health Research Institute, Group Health Cooperative, Seattle, WA, USA
156 Seattle Epidemiologic Research and Information Center, VA Office of Research and Development, Seattle, WA, USA
157 Cardiovascular Research Center, Massachusetts General Hospital, Boston, MA, USA
158 Department of Medical Research, Bærum Hospital, Vestre Viken Hospital Trust, Gjøttum, Norway
159 Saw Swee Hock School of Public Health, National University of Singapore and National University Health System, Singapore
160 National Heart and Lung Institute, Imperial College London, London, UK
161 Department of Gene Diagnostics and Therapeutics, Research Institute, National Center for Global Health and Medicine, Tokyo, Japan
162 Department of Epidemiology, Tulane University School of Public Health and Tropical Medicine, New Orleans, LA, USA
163 Department of Cardiology, University Medical Center Groningen, University of Groningen, Netherlands
164 MRC-PHE Centre for Environment and Health, School of Public Health, Department of Epidemiology and Biostatistics, Imperial College London, London, UK

165 Department of Epidemiology and Biostatistics, Imperial College London, London, UK
166 Department of Cardiology, Ealing Hospital NHS Trust, Southall, UK
167 National Heart, Lung and Blood Research Institute, Division of Intramural Research, Population Sciences Branch, Framingham, MA, USA
168 A full list of members and affiliations appears at the end of the manuscript
169 Department of Pharmaceutical Sciences, College of Pharmacy, University of Oklahoma Health Sciences Center, Oklahoma City, OK, USA
170 Oklahoma Center for Neuroscience, Oklahoma City, OK, USA
171 Department of Pathology and Genetics, Institute of Biomedicine, The Sahlgrenska Academy at University of Gothenburg, Gothenburg, Sweden
172 Department of Neurology, Helsinki University Hospital, Helsinki, Finland
173 Clinical Neurosciences, Neurology, University of Helsinki, Helsinki, Finland
174 Department of Neurology, University of Washington, Seattle, WA, USA
175 Albrecht Kossel Institute, University Clinic of Rostock, Rostock, Germany
176 Clinical Trial Service Unit and Epidemiological Studies Unit, Nuffield Department of Population Health, University of Oxford, Oxford, UK
177 Department of Genetics, Perelman School of Medicine, University of Pennsylvania, PA, USA
178 Faculty of Medicine, University of Iceland, Reykjavik, Iceland
179 Departments of Neurology and Public Health Sciences, University of Virginia School of Medicine, Charlottesville, VA, USA
180 Department of Neurology, Boston University School of Medicine, Boston, MA, USA
181 Human Genetics Center, University of Texas Health Science Center at Houston, Houston, TX, USA
182 Center for Genomic Medicine, Kyoto University Graduate School of Medicine, Kyoto, Japan
183 Munich Cluster for Systems Neurology (SyNergy), Munich, Germany
184 German Center for Neurodegenerative Diseases (DZNE), Munich, Germany
185 Boston University School of Medicine, Boston, MA, USA
186 University of Kentucky College of Public Health, Lexington, KY, USA
187 University of Newcastle and Hunter Medical Research Institute, New Lambton, Australia
188 Univ. Montpellier, Inserm, U1061, Montpellier, France
189 Centre for Research in Environmental Epidemiology, Barcelona, Spain
190 Department of Neurology, Università degli Studi di Perugia, Umbria, Italy
191 Department of Medicine, University of Maryland School of Medicine, Baltimore, MD, USA
192 Broad Institute, Cambridge, MA, USA
193 Univ. Bordeaux, Inserm, Bordeaux Population Health Research Center, UMR 1219, Bordeaux, France
194 Bordeaux University Hospital, Department of Neurology, Memory Clinic, Bordeaux, France
195 Neurovascular Research Laboratory. Vall d'Hebron Institut of Research, Neurology and Medicine Departments-Universitat Autònoma de Barcelona. Vall d'Hebrón Hospital, Barcelona, Spain
196 University Medicine Greifswald, Department of Internal Medicine B, Greifswald, Germany
197 DZHK, Greifswald, Germany
198 Robertson Center for Biostatistics, University of Glasgow, Glasgow, UK
199 Hero DMC Heart Institute, Dayanand Medical College & Hospital, Ludhiana, India
200 Atherosclerosis Research Unit, Department of Medicine Solna, Karolinska Institutet, Stockholm, Sweden
201 Karolinska Institutet, Stockholm, Sweden
202 Division of Emergency Medicine, and Department of Neurology, Washington University School of Medicine, St. Louis, MO, USA

203 Tohoku Medical Megabank Organization, Sendai, Japan
204 Department of Psychiatry, Washington University School of Medicine, St. Louis, MO, USA
205 Department of Public Health and Caring Sciences / Geriatrics, Uppsala University, Uppsala, Sweden
206 Epidemiology and Prevention Group, Center for Public Health Sciences, National Cancer Center, Tokyo, Japan
207 Department of Internal Medicine and the Center for Clinical and Translational Science, The Ohio State University, Columbus, OH, USA
208 Institute of Neuroscience and Physiology, the Sahlgrenska Academy at University of Gothenburg, Goteborg, Sweden
209 Department of Basic and Clinical Neurosciences, King's College London, London, UK
210 Department of Health Care Administration and Management, Graduate School of Medical Sciences, Kyushu University, Japan
211 Department of Medicine and Clinical Science, Graduate School of Medical Sciences, Kyushu University, Japan
212 Landspítali National University Hospital, Departments of Neurology & Radiology, Reykjavik, Iceland
213 Department of Neurology, Heidelberg University Hospital, Germany
214 Department of Neurology, Erasmus University Medical Center
215 Hospital Universitari Mutua Terrassa, Terrassa (Barcelona), Spain
216 Albert Einstein College of Medicine, Montefiore Medical Center, New York, NY, USA
217 John Hunter Hospital, Hunter Medical Research Institute and University of Newcastle, Newcastle, NSW, Australia
218 Centre for Prevention of Stroke and Dementia, Nuffield Department of Clinical Neurosciences, University of Oxford, UK
219 Department of Medical Sciences, Uppsala University, Uppsala, Sweden
220 Genetic and Genomic Epidemiology Unit, Wellcome Trust Centre for Human Genetics, University of Oxford, Oxford, UK
221 The Wellcome Trust Centre for Human Genetics, Oxford, UK
222 Beth Israel Deaconess Medical Center, Boston, MA, USA
223 Wake Forest School of Medicine, Wake Forest, NC, USA
224 Department of Neurology, University of Pittsburgh, Pittsburgh, PA, USA
225 BioBank Japan, Laboratory of Clinical Sequencing, Department of Computational biology and medical Sciences, Graduate school of Frontier Sciences, The University of Tokyo, Tokyo, Japan
226 Neurovascular Research Laboratory, Vall d'Hebron Institut of Research, Neurology and Medicine Departments-Universitat Autònoma de Barcelona. Vall d'Hebrón Hospital, Barcelona, Spain
227 Department of Biostatistics, University of Liverpool, Liverpool, UK
228 Wellcome Trust Centre for Human Genetics, University of Oxford, Oxford, UK
229 Institute of Genetic Epidemiology, Helmholtz Zentrum München - German Research Center for Environmental Health, Neuherberg, Germany
230 Department of Medicine I, Ludwig-Maximilians-Universität, Munich, Germany
231 DZHK (German Centre for Cardiovascular Research), partner site Munich Heart Alliance, Munich, Germany
232 Department of Cerebrovascular Diseases, Fondazione IRCCS Istituto Neurologico "Carlo Besta", Milano, Italy
233 Karolinska Institutet, MEB, Stockholm, Sweden
234 University of Tartu, Estonian Genome Center, Tartu, Estonia, Tartu, Estonia
235 Department of Clinical and Experimental Sciences, Neurology Clinic, University of Brescia, Italy
236 Translational Genomics Unit, Department of Oncology, IRCCS Istituto di Ricerche Farmacologiche Mario Negri, Milano, Italy

237 Department of Genetics, Microbiology and Statistics, University of Barcelona, Barcelona, Spain
238 Psychiatric Genetics Unit, Group of Psychiatry, Mental Health and Addictions, Vall d'Hebron Research Institute (VHIR), Universitat Autònoma de Barcelona, Biomedical Network Research Centre on Mental Health (CIBERSAM), Barcelona, Spain
239 Department of Neurology, IMIM-Hospital del Mar, and Universitat Autònoma de Barcelona, Spain
240 IMIM (Hospital del Mar Medical Research Institute), Barcelona, Spain
241 National Institute for Health Research Comprehensive Biomedical Research Centre, Guy's & St. Thomas' NHS Foundation Trust and King's College London, London, UK
242 Division of Health and Social Care Research, King's College London, London, UK
243 FIMM-Institute for Molecular Medicine Finland, Helsinki, Finland
244 THL-National Institute for Health and Welfare, Helsinki, Finland
245 Iwate Tohoku Medical Megabank Organization, Iwate Medical University, Iwate, Japan
246 BHF Glasgow Cardiovascular Research Centre, Faculty of Medicine, Glasgow, UK
247 deCODE Genetics/Amgen, Inc., Reykjavik, Iceland
248 Icelandic Heart Association, Reykjavik, Iceland
249 Institute of Biomedicine, the Sahlgrenska Academy at University of Gothenburg, Goteborg, Sweden
250 Department of Epidemiology, University of Maryland School of Medicine, Baltimore, MD, USA
251 Institute of Cardiovascular and Medical Sciences, Faculty of Medicine, University of Glasgow, Glasgow, UK
252 Chair of Genetic Epidemiology, IBE, Faculty of Medicine, LMU Munich, Germany
253 Division of Epidemiology and Prevention, Aichi Cancer Center Research Institute, Nagoya, Japan
254 Department of Epidemiology, Nagoya University Graduate School of Medicine, Nagoya, Japan
255 University Medicine Greifswald, Institute for Community Medicine, SHIP-KEF, Greifswald, Germany
256 Department of Neurology, Caen University Hospital, Caen, France
257 University of Caen Normandy, Caen, France
258 Department of Internal Medicine, Erasmus University Medical Center, Rotterdam, Netherlands
259 Landspítali University Hospital, Reykjavik, Iceland
260 Survey Research Center, University of Michigan, Ann Arbor, MI, USA
261 University of Virginia Department of Neurology, Charlottesville, VA, USA