



## Mamede de Carvalho

### Contact

Mamede de Carvalho

## Publications (25)

Van Daele S, Moisse M, Farei-Campagna J, Zwamborn R, van der Spek R, van Rheenen W, van Eijk K, Kenna K, Corcia P, Vourc'h P, Couratier P, Hardiman O, McLaughlin R, Gotkine M, Drory V, Ticozzi N, Silani V, Ratti A, de Carvalho M, Mora J, Povedano M, Andersen P, Weber M, Başak N, Shaw C, Openshaw P, Morrison K, Landers J, Glass J, van Es M, van den Berg L, Al-Chalabi A, Veldink J, Van Damme P. Genetic variability in sporadic amyotrophic lateral sclerosis. *Brain* 2023; 146:3760-3769.

Adey B, Cooper-Knock J, Al Khleifat A, Fogh I, Van Damme P, Corcia P, Couratier P, Hardiman O, McLaughlin R, Gotkine M, Drory V, Silani V, Ticozzi N, Veldink J, van den Berg L, de Carvalho M, Pinto S, Mora J, Povedano Panades M, Andersen P, Weber M, Başak N, Shaw C, Openshaw P, Morrison K, Landers J, Glass J, Vourc'h P, Dobson R, Breen G, Al-Chalabi A, Jones A, Iacoangeli A. Large-scale analyses of CAV1 and CAV2 suggest their expression is higher in post-mortem ALS brain tissue and affects survival. *Front Cell Neurosci* 2023; 17:1112405.

Al Khleifat A, Iacoangeli A, Jones A, Van Vugt J, Moisse M, Shatunov A, Zwamborn R, van der Spek R, Cooper-Knock J, Topp S, van Rheenen W, Kenna B, van Eijk K, Kenna K, Byrne R, López V, Opie-Martin S, Vural A, Campos Y, Weber M, Smith B, Fogh I, Silani V, Morrison K, Dobson R, van Es M, McLaughlin R, Vourc'h P, Chio A, Corcia P, de Carvalho M, Gotkine M, Panades M, Mora J, Shaw P, Landers J, Glass J, Shaw C, Başak N, Hardiman O, Robberecht W, Van Damme P, van den Berg L, Veldink J, Al-Chalabi A. Telomere length analysis in amyotrophic lateral sclerosis using large-scale whole genome sequence data. *Front Cell Neurosci* 2022; 16:1050596.

Tazelaar G, Hop P, Seelen M, Van Vugt J, van Rheenen W, Kool L, van Eijk K, Gijzen M, Dooijes D, Moisse M, Calvo A, Moglia C, Brunetti M, Canosa A, Nordin A, Pardina J, Ravits J, Al-Chalabi A, Chio A, McLaughlin R, Hardiman O, Van Damme P, de Carvalho M, Neuwirth C, Weber M, Andersen P, van den Berg L, Veldink J, van Es M. Whole genome sequencing analysis reveals post-zygotic mutation variability in monozygotic twins discordant for amyotrophic lateral sclerosis. *Neurobiol Aging* 2022; 122:76-87.

van Rheenen W, van der Spek R, Bakker M, Van Vugt J, Hop P, Zwamborn R, de Klein N, Westra H, Bakker O, Deelen P, Shireby G, Hannon E, Moisse M, Baird D, Restuadi R, Dolzhenko E, Dekker A, Gawor K, Westeneng H, Tazelaar G, van Eijk K, Kooyman M, Byrne R, Doherty M, Heverin M, Al Khleifat A, Iacoangeli A, Shatunov A, Ticozzi N, Cooper-Knock J, Smith B, Gromicho M, Chandran S, Pal S, Morrison K, Shaw P, Hardy J, Orrell R, Sendtner M, Meyer T, Başak N, van der Kooij A, Ratti A, Fogh I, Gellera C, Lauria G, Corti S, Cereda C, Sproviero D, D'Alfonso S, Sorarù G, Siciliano G, Filosto M, Padovani A, Chio A, Calvo A, Moglia C, Brunetti M, Canosa A, Grassano M, Beghi E, Pupillo E, Logroscino G, Nefussy B, Osmanovic A, Nordin A, Lerner Y, Zabari M, Gotkine M, Baloh R, Bell S, Vourc'h P, Corcia P, Couratier P, Millecamps S, Meininger V, Salachas F, Mora Pardina J, Assialioui A, Rojas-García R, Dion P, Ross J, Ludolph A, Weishaupt J, Brenner D, Freischmidt A, Bensimon G, Brice A, Dürr A, Payan C, Saker-Delye S, Wood N, Topp S, Rademakers R, Tittmann L, Lieb W, Franke A, Ripke S, Braun A, Kraft J, Whiteman D, Olsen C, Uitterlinden A, Hofman A, Rietschel M, Cichon S, Nöthen M, Amouyel P, SLALOM Consortium, PARALS Consortium, SLAGEN Consortium, SLAP Consortium, Traynor B, Singleton A, Mitne Neto M, Cauchi R, Ophoff R, Wiedau-Pazos M, Lomen-Hoerth C, Van Deerlin V, Grosskreutz J, Roediger A, Gaur N, Jörk A, Barthel T, Theele E, Ilse B, Stubendorff B, Witte O, Steinbach R, Hübner C, Graff C, Brylev L, Fominykh V, Demeshonok V, Ataulina A, Rogelj B, Koritnik B, Zidar J, Ravnik-Glavač M, Glavač D, Stević Z, Drory V, Povedano M, Blair I, Kiernan M, Benyamin B, Henderson R, Furlong S, Mathers S, McCombe P, Needham M, Ngo S, Nicholson G, Pamphlett R, Rowe D, Steyn F, Williams K, Mather K, Sachdev P, Henders A, Wallace L, de Carvalho M, Pinto S, Petri S, Weber M, Rouleau G, Silani V, Curtis C, Breen G, Glass J, Brown R, Landers J, Shaw C, Andersen P, Groen E, van Es M, Pasterkamp R, Fan D, Garton F, McRae A, Davey Smith G, Gaunt T, Eberle M, Mill J, McLaughlin R, Hardiman O, Kenna K, Wray N, Tsai E, Runz H, Franke L, Al-Chalabi A, Van Damme P, van den Berg L, Veldink J. Author Correction: Common and rare variant association analyses in amyotrophic lateral sclerosis identify 15 risk loci with distinct genetic architectures and neuron-specific biology. *Nat Genet* 2022; 54:361.

Hop P, Zwamborn R, Hannon E, Shireby G, Nabais M, Walker E, van Rheenen W, Van Vugt J, Dekker A, Westeneng H, Tazelaar G, van Eijk K, Moisse M, Baird D, Al Khleifat A, Iacoangeli A, Ticozzi N, Ratti A, Cooper-Knock J, Morrison K, Shaw P, Basak A, Chio A, Calvo A, Moglia C, Canosa A, Brunetti M, Grassano M, Gotkine M, Lerner Y, Zabari M, Vourc'h P, Corcia P, Couratier P, Mora Pardina J, Salas T, Dion P, Ross J, Henderson R, Mathers S, McCombe P, Needham M, Nicholson G, Rowe D, Pamphlett R, Mather K, Sachdev P, Furlong S, Garton F, Henders A, Lin T, Ngo S, Steyn F, Wallace L, Williams K, Neto M, Cauchi R, Blair I, Kiernan M, Drory V, Povedano M, de Carvalho M, Pinto S, Weber M, Rouleau G, Silani V, Landers J, Shaw C, Andersen P, McRae A, van Es M, Pasterkamp R, Wray N, McLaughlin R, Hardiman O, Kenna K, Tsai E, Runz H, Al-Chalabi A, van den Berg L, Van Damme P, Mill J, Veldink J. Genome-wide study of DNA methylation shows alterations in metabolic, inflammatory, and cholesterol pathways in ALS. *Sci Transl Med* 2022; 14:eabj0264.

Kliest T, van Eijk R, Al-Chalabi A, Albanese A, Andersen P, Amador M, Bråthen G, Brunaud-Danel V, Brylev L, Camu W, de Carvalho M, Cereda C, Cetin H, Chaverri D, Chio A, Corcia P, Couratier P, De Marchi F, Desnuelle C, van Es M, Esteban J, Filosto M, García Redondo A, Grosskreutz J, Hanemann C, Holmøy T, Høyer H, Ingre C, Koritnik B, Kuzma-Kozakiewicz M, Lambert T, Leigh P, Lunetta C, Mandrioli J, McDermott C, Meyer T, Mora J, Petri S, Povedano M, Reviers E, Riva N, Roes K, Rubio M, Salachas F, Sarafov S, Sorarù G, Stević Z, Svenstrup K, Møller A, Turner M, Van Damme P, Van Leeuwen L, Varona L, Vázquez Costa J, Weber M, Hardiman O, van den Berg L. Clinical trials in pediatric ALS: a TRICALS feasibility study. *Amyotroph Lateral Scler Frontotemporal Degener* 2022; 23:481-488.

Al Khleifat A, Iacoangeli A, Van Vugt J, Bowles H, Moisse M, Zwamborn R, van der Spek R, Shatunov A, Cooper-Knock J, Topp S, Byrne R, Gellera C, López V, Jones A, Opie-Martin S, Vural A, Campos Y, van Rheenen W, Kenna B, van Eijk K, Kenna K, Weber M, Smith B, Fogh I, Silani V, Morrison K, Dobson R, van Es M, McLaughlin R, Vourc'h P, Chio A, Corcia P, de Carvalho M, Gotkine M, Panadés M, Mora J, Shaw P, Landers J, Glass J, Shaw C, Başak N, Hardiman O, Robberecht W, Van Damme P, van den Berg L, Veldink J, Al-Chalabi A. Structural variation analysis of 6,500 whole genome sequences in amyotrophic lateral sclerosis. *NPJ Genom Med* 2022; 7:8.

van Rheenen W, van der Spek R, Bakker M, Farei-Campagna J, Hop P, Zwamborn R, de Klein N, Westra H, Bakker O, Deelen P, Shireby G, Hannon E, Moisse M, Baird D, Restuadi R, Dolzhenko E, Dekker A, Gawor K, Westeneng H, Tazelaar G, van Eijk K, Kooyman M, Byrne R, Doherty M, Heverin M, Al Khleifat A, Iacoangeli A, Shatunov A, Ticozzi N, Cooper-Knock J, Smith B, Gromicho M, Chandran S, Pal S, Morrison K, Openshaw P, Hardy J, Orrell R, Sendtner M, Meyer T, Başak N, van der Kooi A, Ratti A, Fogh I, Gellera C, Lauria G, Corti S, Cereda C, Sproviero D, D'Alfonso S, Sorarù G, Siciliano G, Filosto M, Padovani A, Chio A, Calvo A, Moglia C, Brunetti M, Canosa A, Grassano M, Beghi E, Pupillo E, Logroscino G, Nefussy B, Osmanovic A, Nordin A, Lerner Y, Zabari M, Gotkine M, Baloh R, Bell S, Vourc'h P, Corcia P, Couratier P, Millecamps S, Meininger V, Salachas F, Mora J, Assialioui A, Rojas-García R, Dion P, Ross J, Ludolph A, Weishaupt J, Brenner D, Freischmidt A, Bensimon G, Brice A, Dürr A, Payan C, Saker-Delye S, Wood N, Topp S, Rademakers R, Tittmann L, Lieb W, Klein-Franke A, Ripke S, Braun A, Kraft J, Whiteman D, Olsen C, Uitterlinden A, Hofman A, Rietschel M, Cichon S, Nöthen M, Amouyel P, SLALOM Consortium, PARALS Consortium, SLAGEN Consortium, SLAP Consortium, Traynor B, Singleton A, Mitne Neto M, Cauchi R, Ophoff R, Wiedau-Pazos M, Lomen-Hoerth C, Van Deerlin V, Grosskreutz J, Roediger A, Gaur N, Jörk A, Barthel T, Theele E, Ilse B, Stubendorff B, Witte O, Steinbach R, Hübner C, Graff C, Brylev L, Fominykh V, Demeshonok V, Ataulina A, Rogelj B, Koritnik B, Zidar J, Ravnik-Glavač M, Glavač D, Stević Z, Drory V, Povedano M, Blair I, Kiernan M, Benjamin B, Henderson R, Furlong S, Mathers S, McCombe P, Needham M, Ngo S, Nicholson G, Pamphlett R, Rowe D, Steyn F, Williams K, Mather K, Sachdev P, Henders A, Wallace L, de Carvalho M, Pinto S, Petri S, Weber M, Rouleau G, Silani V, Curtis C, Breen G, Glass J, Brown R, Landers J, Shaw C, Andersen P, Groen E, van Es M, Pasterkamp R, Fan D, Garton F, McRae A, Davey Smith G, Gaunt T, Eberle M, Mill J, McLaughlin R, Hardiman O, Kenna K, Wray N, Tsai E, Runz H, Franke L, Al-Chalabi A, Van Damme P, van den Berg L, Veldink J. Common and rare variant association analyses in amyotrophic lateral sclerosis identify 15 risk loci with distinct genetic architectures and neuron-specific biology. *Nat Genet* 2021; 53:1636-1648.

Chan Y, Stålberg E, Nandedkar S, de Carvalho M, Shaw P, McDermott C, Jenkins T, Castro J, Barkhaus P, Neuwirth C, Alix J, Weber M. Reinnervation as measured by the motor unit size index is associated with preservation of muscle strength in amyotrophic lateral sclerosis, but not all muscles reinnervate. *Muscle Nerve* 2021; 65:203-210.

Moisse M, Zwamborn R, Van Vugt J, van der Spek R, van Rheenen W, Kenna B, van Eijk K, Kenna K, Corcia P, Couratier P, Vourc'h P, Hardiman O, McLaughlin R, Gotkine M, Drory V, Ticozzi N, Silani V, de Carvalho M, Mora J, Povedano M, Andersen P, Weber M, Başak N, Chen X, Eberle M, Al-Chalabi A, Shaw C, Openshaw P, Morrison K, Landers J, Glass J, Robberecht W, van Es M, Van den Berg L, Veldink J, Van Damme P, Project MinE Sequencing Consortium. The Effect of SMN Gene Dosage on ALS Risk and Disease Severity. *Ann Neurol* 2021; 89:686-697.

Alix J, Nandedkar S, Stålberg E, Barkhaus P, Furtula J, van Dijk J, Baldinger R, Costa J, Otto M, Sandberg A, Schrooten M, Omer T, Moglia C, Neuwirth C, Gelder L, Burkhardt C, Castro J, de Carvalho M, Gawel M, Goedee S, Grosskreutz J, Lenglet T, Weber M. Assessment of the reliability of the motor unit size index (MUSIX) in single subject "round-robin" and multi-centre settings. *Clin Neurophysiol* 2019; 130:666-674.

German ALS network MND-NET, Weis J, Dorst J, Volk A, Borck G, Sperfeld A, de Carvalho M, Klopstock T, Sendtner M, Otto M, Schuster J, Weishaupt J, Andersen P, Ludolph A, Meitinger T, Freischmidt A, Danzer K, Braak H, Del Tredici K, Jablonka S, Kubisch C, Zeller D, Weydt P, Grosskreutz J, Meyer T, Petri S, Grehl T, Müller K, Yilmaz R, Rosenbohm A, Ruf W, Neuwirth C, Hübers A, Günther K, Knehr A, Jordan B, Schrank B, Claeys K, Pinto S, Weber M, Brenner D. Reply: Adult-onset distal spinal muscular atrophy: a new phenotype associated with KIF5A mutations. *Brain* 2019; 142:e67.

van den Berg L, Grosskreutz J, Weber M, Couratier P, Corcia P, van Es M, Bredenoord A, Shaw C, Gunkel A, Rödiger A, Ludolph A, Petri S, de Carvalho M, Veldink J, Moons K, Hardiman O, Chio A, Al-Chalabi A, Shaw P, Turner M, Talbot K, Van Damme P, Ringer T, Körner S, Gromicho M, Pinto S, Thompson A, McDermott C, Martin S, Calvo A, Rooney J, van Eijk R, Visser A, Debray T, Kobeleva X, Rosenbohm A, Stubendorff B, Hollinger H, Kazoka M, Heverin M, Vajda A, van Rheenen W, Van Vugt J, Dekker A, Middelkoop B, Sommer H, Westeneng H. Prognosis for patients with amyotrophic lateral sclerosis: development and validation of a personalised prediction model. *Lancet Neurol* 2018; 17:423-433.

Weishaupt J, Weis J, Dorst J, Volk A, Borck G, Sperfeld A, de Carvalho M, Klopstock T, Sendtner M, Otto M, Schuster J, Andersen P, Ludolph A, Strom T, Meitinger T, Freischmidt A, Danzer K, Braak H, Del Tredici K, Jablonka S, Kubisch C, German ALS network MND-NET, Ruf W, Weydt P, Grosskreutz J, Meyer T, Petri S, Grehl T, Müller K, Yilmaz R, Neuwirth C, Weber M, Zeller D, Hübers A, Günther K, Knehr A, Jordan B, Schrank B, Claeys K, Pinto S, Brenner D. Hot-spot KIF5A mutations cause familial ALS. *Brain* 2018

Van Der Spek R, Hardiman O, Mora J, Morrison K, Mitne-Neto M, Robberecht W, Shaw P, Panadés M, Van Damme P, Silani V, Gotkine M, Weber M, van Es M, Landers J, Al-Chalabi A, van den Berg L, Veldink J, Glass J, Drory V, van Rheenen W, Pulit S, Kenna K, Ticozzi N, Kooyman M, McLaughlin R, Moisse M, van Eijk K, Van Vugt J, Andersen P, Nazli Basak A, Blair I, de Carvalho M, Chio A, Corcia P, Couratier P, PROJECT MINE ALS SEQUENCING CONSORTIUM. Reconsidering the causality of TIA1 mutations in ALS. *Amyotroph Lateral Scler Frontotemporal Degener* 2017:1-3.

van den Berg L, Silani V, Shaw P, Salachas F, Povedano Panades M, Petri S, Nygren I, Mora Pardina J, Mitre Ropero B, Staaf G, Svenstrup K, Hardiman O, Wolf J, Weydt P, Weber M, van der Kooi A, Van Damme P, Tysnes O, Talbot K, Meyer T, McDermott C, Ludolph A, Desnuelle C, de Carvalho M, Danielsson O, Couratier P, Corcia P, Chio A, Chandran S, Andersen P, Grehl T, Grosskreutz J, Laaksovirta H, KuzmaKozakiewicz M, Koritnik B, Koch J, Kleveland G, Karlsborg M, Ingre C, Holmøy T, Al-Chalabi A. July 2017 ENCALS statement on edaravone. *Amyotroph Lateral Scler Frontotemporal Degener* 2017; 18:471-474.

Neuwirth C, Barkhaus P, Burkhardt C, Castro J, Czell D, de Carvalho M, Nandedkar S, Stålberg E, Weber M. Motor Unit Number Index (MUNIX) detects motor neuron loss in pre-symptomatic muscles in Amyotrophic Lateral Sclerosis. *Clin Neurophysiol* 2016

Nordin A, Burkhardt C, Neuwirth C, Holmøy T, Morita M, Tysnes O, Benatar M, Wu J, Lange D, Bisgård C, Asgari N, Tarvainen I, Brännström T, Weber M, Schweikert K, Grehl T, Akimoto C, Wuolikainen A, Alstermark H, Forsberg K, Baumann P, Pinto S, de Carvalho M, Hübers A, Nordin F, Ludolph A, Weishaupt J, Meyer T, Andersen P. Sequence variations in C9orf72 downstream of the hexanucleotide repeat region and its effect on repeat-primed PCR interpretation: a large multinational screening study. *Amyotroph Lateral Scler Frontotemporal Degener* 2016; 18:256-264.

Zhang K, Arcuti S, Brunetti M, Moglia C, Calvo A, Ratti A, Tiloca C, Gellera C, Pensato V, Mazzini L, Capozzo R, Zecca C, Blair I, Stuit R, Muller B, Filosto M, Padovani A, Riva N, Penco S, Lunetta C, Sorarù G, Bertolin C, Blauw H, Curtis C, Hofman A, Estrada K, Rivadeneira F, Uitterlinden A, Dartigues J, Tzourio C, Amouyel P, van der Kooi A, de Visser M, D'Alfonso S, Comi G, Del Bo R, Cereda C, Pansarasa O, Smith B, Shaw C, Weber M, Goris A, Nöthen M, McCann E, Veldink J, Corcia P, Andersen P, Hardiman O, Landers J, Glass J, Brown R, Pers T, Franke L, Van Damme P, Vourc'h P, Silani V, van den Berg L, Al-Chalabi A, Breen G, Lewis C, Pasterkamp R, van Es M, de Bakker P, Visscher P, Wray N, Robberecht W, Weishaupt J, Stubendorff B, Prell T, Ringer T, Witte O, Grosskreutz J, Kiernan M, Pamphlett R, Rowe D, Nicholson G, Kurth I, Hübner C, Ludolph A, Powell J, Logroscino G, Tortelli R, Pupillo E, Beghi E, Chio A, Casale F, Leigh P, Fifita J, Chandran S, Koritnik B, Ravnik-Glavač M, Vrabec K, Rogelj B, Lin K, Ticozzi N, Vajda A, Menelaou A, Medic J, Zidar J, Leonardis L, Polak M, Rojas-García R, Mora J, Pinto S, de Carvalho M, Meininger V, Salachas F, Millecamps S, Grošelj L, Brands W, Schellevis R, Robinson M, de Jong S, Vösa U, van der Spek R, Pulit S, Diekstra F, McLaughlin R, Dekker A, Shatunov A, Yang J, Fogh I, Harschnitz O, van Eijk K, Kenna K, Jones A, Sproviero W, Blokhuis A, Koppers M, Tazelaar G, van Doormaal P, van Rheenen W, Colville S, Cichon S, Maurel C, Andres C, Radivojkov-Blagojevic M, Lichtner P, Meitinger T, Parman Y, Hamzeiy H, Tunca C, Basak A, Bensimon G, Landwehrmeyer B, Rietschel M, Franke A, Lieb W, Tittmann L, Wood N, Dürr A, Saker-Delye S, Payan C, Brice A, McCluskey L, Elman L, Topp S, Malaspina A, Fratta P, Sidle K, Pittman A, Orrell R, Hardy J, Shaw P, Morrison K, Petri S, Abdulla S, Trojanowski J, Van Deerlin V, Lomen-Hoerth C, Wiedau-Pazos M, Staats K, Ophoff R, Meyer T, Sendtner M, Drepper C, Swingler R. Genome-wide association analyses identify new risk variants and the genetic architecture of amyotrophic lateral sclerosis. *Nat Genet* 2016; 48:1043-8.

Neuwirth C, Schrooten M, Omer T, Moglia C, Lenglet T, Grosskreutz J, Goedee S, Gawel M, de Carvalho M, Castro J, Alix J, Burkhardt C, Weber M. Quality Control of Motor Unit Number Index (MUNIX) Measurements in 6 Muscles in a Single-Subject "Round-Robin" Setup. *PLoS one* 2016; 11:e0153948.

Neuwirth C, Barkhaus P, Burkhardt C, Castro J, Czell D, de Carvalho M, Nandedkar S, Stålberg E, Weber M. Tracking motor neuron loss in a set of six muscles in amyotrophic lateral sclerosis using the Motor Unit Number Index (MUNIX): a 15-month longitudinal multicentre trial. *J Neurol Neurosurg Psychiatr* 2015; 86:1172-9.

Kubisch C, de Carvalho M, Lloyd-Jani A, Konno T, DeJesus-Hernandez M, Angerbauer S, Daoud H, Just W, Tradowsky D, Mouzat K, Landers J, Veldink J, Andersen P, Rademakers R, Van Broeckhoven C, van den Berg L, Rouleau G, Shaw C, Gitler A, Silani V, Nordin A, Calini D, Birve A, Onodera O, Neitzel B, Camu W, Lumbroso S, Leblond C, Van den Broeck M, van Blitterswijk M, Volk A, van Rheenen W, Pinto S, Weber M, Alstermark H, van der Zee J, Ratti A, Chesi A, Keagle P, Talbot K, Proven M, Smith B, Akimoto C. A blinded international study on the reliability of genetic testing for GGGGCC-repeat expansions in C9orf72 reveals marked differences in results among 14 laboratories. *J Med Genet* 2014; 51:419-24.

EFNS Task Force on Diagnosis and Management of Amyotrophic Lateral Sclerosis: Wasner M, Tomik B, Silani V, Pradat P, Petri S, Morrison K, Kollwe K, Hardiman O, Van Damme P, Chio A, de Carvalho M, Borasio G, Abrahams S, Andersen P, Weber M. EFNS guidelines on the clinical management of amyotrophic lateral sclerosis (MALS)--revised report of an EFNS task force. *Eur J Neurol* 2011; 19:360-75.

Lee T, Andersen P, Bonini N, Gispert S, Auburger G, Tysnes O, Meyer T, de Carvalho M, Gredal O, Grehl T, Weber M, Ingre C, Li Y, Gitler A. Ataxin-2 intermediate-length polyglutamine expansions in European ALS patients. *Hum Mol Genet* 2011; 20:1697-700.

## Projects (0)

No results found.

---

Kantonsspital St.Gallen

Rorschacher Strasse 95

CH-9007 St.Gallen

T: +41 71 494 11 11

[support.forschung@kssg.ch](mailto:support.forschung@kssg.ch)