

Title: Primary Autosomal Recessive Microcephalies and Seckel Syndrome Spectrum Disorders *GeneReview* Table 5

Authors: Verloes A, Drunat S, Gressens P, Passemard S

Updated: October 2013

Note: The following information is provided by the authors listed above and has not been reviewed by *GeneReviews* staff.

Table 5. Published Pathogenic *MCPH1* Allelic Variants (Based on Reference Sequences NG_016619 and NP_078872.2)

DNA Nucleotide Change	Protein Amino Acid Change
Deletion exons 1-6 (150-200 kb deletion) [Garshasbi et al 2006, Darvish et al 2010]	p.0?
deletion exons 2 and 3 [Darvish et al 2010]	Not described
Deletion exon 3 [Darvish et al 2010]	Not described
Deletion exon 4 [Darvish et al 2010]	Not described
Large deletions [Garshasbi et al 2006, Darvish et al 2010]	p.0 ?
c.74C>G [Jackson et al 2002]	p.Ser25Ter
c.80 C>G [Trimborn et al 2005]	p.Thr27Arg
c.147C>G [Darvish et al 2010]	p.His49Gln
c.149T>G [Leung et al 2011]	p.Val50Gly
c.215C>T [Trimborn et al 2005, Ghani-Kakhki et al 2012]	p.Ser72Leu
c.233T>C [Ghani-Kakhki et al 2012]	p.Trp75Arg
c.302C>G [Tommerup et al 1993]	p.Ser101Ter
c.427_428insA [Trimborn et al 2004]	p.Thr143AsnfsTer5 [Neitzel et al 2002, Trimborn et al 2004] and p.Thr27Arg [Trimborn et al 2005]
c.436+1G>T [Darvish et al 2010]	Splice mutation not otherwise characterized
c.566_567insA [Darvish et al 2010]	p.Asn189fs
c.1179delG [Sajid Hussain et al 2013]	p.Arg393SerfsTer50

See [Quick Reference](#) for an explanation of nomenclature. *GeneReviews* follows the standard naming conventions of the Human Genome Variation Society (www.hgvs.org).

References

- Darvish H, Esmaeeli-Nieh S, Monajemi GB, Mohseni M, Ghasemi-Firouzabadi S, Abedini SS, Bahman I, Jamali P, Azimi S, Mojahedi F, Dehghan A, Shafeeghati Y, Jankhah A, Falah M, Soltani Banavandi MJ, Ghani-Kakhki M, Garshasbi M, Rakhshani F, Naghavi A, Tzschach A, Neitzel H, Ropers HH, Kuss AW, Behjati F, Kahrizi K, Najmabadi H. A clinical and molecular genetic study of 112 Iranian families with primary microcephaly. *J Med Genet.* 2010;47:823-8.
- Ghani-Kakhki M, Robinson PN, Morlot S, Mitter D, Trimborn M, Albrecht B, Varon R, Sperling K, Neitzel H. Two missense mutations in the primary autosomal recessive microcephaly gene MCPH1 disrupt the function of the highly conserved N-terminal BRCT domain of microcephalin. *Mol Syndromol.* 2012;3:6-13.
- Garshasbi M, Motazacker MM, Kahrizi K, Behjati F, Abedini SS, Nieh SE, Firouzabadi SG, Becker C, Rüschendorf F, Nürnberg P, Tzschach A, Vazifehmand R, Erdogan F, Ullmann R, Lenzner S, Kuss AW, Ropers HH, Najmabadi H. SNP array-based homozygosity mapping reveals MCPH1 deletion in family with autosomal recessive mental retardation and mild microcephaly. *Hum Genet.* 2006;118:708-15.
- Jackson AP, Eastwood H, Bell SM, Adu J, Toomes C, Carr IM, Roberts E, Hampshire DJ, Crow YJ, Mighell AJ, Karbani G, Jafri H, Rashid Y, Mueller RF, Markham AF, Woods CG. Identification of microcephalin, a protein implicated in determining the size of the human brain. *Am J Hum Genet.* 2002;71:136-42.
- Leung JW, Leitch A, Wood JL, Shaw-Smith C, Metcalfe K, Bicknell LS, Jackson AP, Chen J. SET nuclear oncogene associates with microcephalin/MCPH1 and regulates chromosome condensation. *J Biol Chem.* 2011;286:21393-400.
- Neitzel H, Neumann LM, Schindler D, Wirges A, Tönnies H, Trimborn M, Krebssova A, Richter R, Sperling K. Premature chromosome condensation in humans associated with microcephaly and mental retardation: a novel autosomal recessive condition. *Am J Hum Genet.* 2002;70:1015-22.
- Sajid Hussain M, Marriam Bakhtiar S, Farooq M, Anjum I, Janzen E, Reza Toliat M, Eiberg H, Kjaer KW, Tommerup N, Noegel AA, Nürnberg P, Baig SM, Hansen L. Genetic heterogeneity in Pakistani microcephaly families. *Clin Genet.* 2013;83:446-51.
- Tommerup N, Mortensen E, Nielsen MH, Wegner RD, Schindler D, Mikkelsen M. Chromosomal breakage, endomitosis, endoreduplication, and hypersensitivity toward radiomimetic and alkylating agents: a possible new autosomal recessive mutation in a girl with craniosynostosis and microcephaly. *Hum Genet.* 1993;92:339-46.
- Trimborn M, Bell SM, Felix C, Rashid Y, Jafri H, Griffiths PD, Neumann LM, Krebs A, Reis A, Sperling K, Neitzel H, Jackson AP. Mutations in microcephalin cause aberrant regulation of chromosome condensation. *Am J Hum Genet.* 2004;75:261-6.
- Trimborn M, Richter R, Sternberg N, Gavvovidis I, Schindler D, Jackson AP, Prott EC, Sperling K, Gillessen-Kaesbach G, Neitzel H. The first missense alteration in the MCPH1 gene causes autosomal recessive microcephaly with an extremely mild cellular and clinical phenotype. *Hum Mutat.* 2005;26:496.