Supplementary Table 1: List of patients and variants identified in the cohort.

Patient	Gene	Status	Variant 1	Variant 2
1	*AGRN*	Homozygous	c.1214G>A p.Cys405Tyr (C406Y, exon 7/36)	/
2	*AGRN*	Homozygous	c.5125G>C p.Gly1709Arg (G1709R, exon 29/36)	/
3	*AGRN*	Compound heterozygous	c.5012G>A p.Arg1671Gln (R1671Q, exon 29/36)	c.5093G>C p.Arg1698Pro (R1698P, exon 29/36)
4	*AGRN*	Homozygous	c.5611G>A p.Gly1871Arg (exon 33/36)	/
5	*AGRN*	Homozygous	c.5125G>C p.Gly1709Arg (G1709R, exon 29)	/
6	*AGRN*	Compound heterozygous	c.314A>T p.Asn105Ile (N105I, exon 2/36)	c.1362dup p.Ser445Glnfs*8 (exon 7/36)
7	*AGRN*	Compound heterozygous	c.314A>T p.Asn105Ile (N105I, exon 2/36)	c.1362dup p.Ser445Glnfs*8 (exon 7/36)
8	*AGRN*	Compound heterozygous	c.3664G>C p.Ala1222Pro	c.5084T>C p.Leu1695Pro
9	*AGRN*	Compound heterozygous	c.3664G>C p.Ala1222Pro	c.5084T>C p.Leu1695Pro
10	*AGRN*	Compound heterozygous	c.3602G>C p.Arg1201Pro (exon 21)	c.4525C>T p.Arg1509Trp (exon 26)
11	*AGRN*	Compound heterozygous	c.3602G>C p.Arg1201Pro (exon 21)	c.4525C>T p.Arg1509Trp (exon 26)
12	*AGRN*	Homozygous	c.[3616G>T ;3719C>T] p.[Val1206Leu ;Pro1240Leu] (exons 21 and 22)	/
13	*CHRNA1*	Homozygous	c.257G>A p.Arg86His (R86H, exon p3a)	/
14	*CHRNA1* (SCCMS)	Simple heterozygous	c.517G>A p.Gly173Ser (G153S, exon 5)	/
15	*CHRNA1* (SCCMS)	Simple heterozygous	c.517G>A p.Gly173Ser (G153S, exon 5)	/
16	*CHRNA1* (SCCMS)	Simple heterozygous	c.517G>A p.Gly173Ser (G153S, exon 5)	/
17	*CHRNA1* (SCCMS)	Simple heterozygous	c.517G>A p.Gly173Ser (G153S, exon 5)	/
18	*CHRNA1* (SCCMS)	Simple heterozygous	c.517G>A p.Gly173Ser (G153S, exon 5)	/
19	*CHRNA1* (SCCMS)	Simple heterozygous	c.517G>A p.Gly173Ser (G153S, exon 5)	/
20	*CHRNA1* (SCCMS)	Simple heterozygous	c.517G>A p.Gly173Ser (G153S, exon 5)	/
21	*CHRNA1* (SCCMS)	Simple heterozygous	c.517G>A p.Gly173Ser (G153S, exon 5)	/
22	*CHRNA1* (SCCMS)	Simple heterozygous	c.821C>T p.Thr274Ile (T254I, exon 7/12)	/
23	*CHRNA1* (SCCMS)	Simple heterozygous	c.821C>T p.Thr274Ile (T254I, exon 7/12)	/
24	*CHRNA1* (SCCMS)	Simple heterozygous	c.517G>A p.Gly173Ser (G153S, exon 5)	/
25	*CHRNA1* (SCCMS)	Simple heterozygous	c.517G>A p.Gly173Ser (G153S, exon 5)	/
26	*CHRNA1* (SCCMS)	Simple heterozygous	c.517G>A p.Gly173Ser (G153S, exon 5)	/
27	*CHRNA1* (SCCMS)	Simple heterozygous	c.517G>A p.Gly173Ser (G153S, exon 5)	/
28	*CHRNE* (SCCMS)	Simple heterozygous	c.835G>C p.Val279Leu (V259L, exon 8/12)	/
29	*CHRNE* (SCCMS)	Simple heterozygous	c.835G>C p.Val279Leu (V259L, exon 8/12)	/
30	*CHRNE* (SCCMS)	Simple heterozygous	c.721C>T p.Leu241Phe (L221F, exon 7/12)	/
31	*CHRNE* (SCCMS)	Simple heterozygous	c.721C>T p.Leu241Phe (L221F, exon 7/12)	/
32	*CHRNE* (SCCMS)	Simple heterozygous	c.721C>T p.Leu241Phe (L221F, exon 7/12)	/
33	*CHRNE* (SCCMS)	Simple heterozygous	c.865C>T p.Leu289Phe (L269F, exon 8/12)	/
34	*CHRNB1*	Compound heterozygous	c.516C>G p.Tyr172*	c.727C>T p.Arg243Cys
35	*CHRND*	Compound heterozygous	c.826G>A p.Glu276Lys (exon 8)	c.862C>G p.Gln288Glu (exon 8)
36	*CHRND*	Compound heterozygous	c.243+1G>A p.? (intron 3)	c.389A>T p.Asn130Ile (exon 5)
37	*CHRND*	Homozygous	c.991C>T p.Leu331Phe	/
38	*CHRND*	Compound heterozygous	c.982_983del p.Val328Hisfs*17 (919_920delGT, exon 9)	c.1334 T>C p.Ile445Thr (I424T, exon 11)

39	*CHRNE*	Compound heterozygous	c.130dupG p.Glu44Glyfs*3 (70insG, exon 2/12)	c.556_563del p.(Gly186Hisfs*13) (exon 6/12)
40	*CHRNE*	Homozygous	c.1327-10_1338dup22 p.Trp447Profs*16 (intron 11 and exon 12)	/
41	*CHRNE*	Homozygous	c.1002_1008dupCACCCAC p.Ala337Hisfs*62 (exon 9)	/
42	*CHRNE*	Homozygous	c.130dupG p.Glu44Glyfs*3 (70insG, exon 2/12)	/
43	*CHRNE*	Homozygous	c.905C>G p.Pro302Arg	/
44	*CHRNE*	Homozygous	c.905C>G p.Pro302Arg	/
45	*CHRNE*	Compound heterozygous	c.629 G>T p.Cys210Phe	c.1353dup p.Asn452GlufsX4
46	*CHRNE*	Homozygous	c.1327del p.Glu443Lysfs*64 (11267delG, exon 12/12)	/
47	*CHRNE*	Homozygous	c.1353dupG p.Asn452Glufs*4 (1293insG, exon 12/12)	/
48	*CHRNE*	Homozygous	c.355 C>T p.Gln119* (Q99X, exon 5/12)	/
49	*CHRNE*	Compound heterozygous	c.1327del p.Glu443Lysfs*64 (11267delG, exon 12/12)	c.1457_1458dupCC p.Tyr487Profs*21 (exon 12/12)
50	*CHRNE*	Compound heterozygous	c.962delA p.Asn321Ilefs*64 (902delA, exon 9/12)	c.1216_1219+19del p. ? (exon 10 and intron 10)
51	*CHRNE*	Homozygous	c.1353dupG p.Asn452Glufs*4 (1293insG, exon 12/12)	/
52	*CHRNE*	Homozygous	c.1353dupG p.Asn452Glufs*4 (1293insG, exon 12/12)	/
53	*CHRNE*	Homozygous	c.130dupG p.Glu44Glyfs*3 (70insG, exon 2/12)	/
54	*CHRNE*	Compound heterozygous	c.130dupG p.Glu44Glyfs*3 (70insG, exon 2/12)	c.888_889delGA p.Glu296Aspfs*100 (exon 8/12)
55	*CHRNE*	Homozygous	c.130dupG p.Glu44Glyfs*3 (70insG, exon 2/12)	/
56	*CHRNE*	Homozygous	c.130dupG p.Glu44Glyfs*3 (70insG, exon 2/12)	/
57	*CHRNE*	Homozygous	c.1327del p.Glu443Lysfs*64 (11267delG, exon 12/12)	/
58	*CHRNE*	Homozygous	c.915 C>T p.Gly305Gly (G305G, exon 8)	/
59	*CHRNE*	Homozygous	c.130dupG p.Glu44Glyfs*3 (70insG, exon 2/12)	/
60	*CHRNE*	Compound heterozygous	c.250C>T p.Arg84* (R64X, exon 4/12)	c.971delT p.Ile324Thrfs*61 (exon 9/12)
61	*CHRNE*	Compound heterozygous	c.[325G>A;c.581T>C] p.[Glu109Lys;Ile194Thr] (E89K-I174T, exons 4 and 6/12)	c.872C>T p.Ala291Val (A271V, exon 8/12)
62	*CHRNE*	Compound heterozygous	c.[325G>A;c.581T>C] p.[Glu109Lys;Ile194Thr] (E89K-I174T, exons 4 and 6/12)	c.872C>T p.Ala291Val (A271V, exon 8/12)
63	*CHRNE*	Homozygous	c.1327del p.Glu443Lysfs*64 (11267delG, exon 12/12)	/
64	*CHRNE*	Homozygous	c.1327del p.Glu443Lysfs*64 (11267delG, exon 12/12)	/
65	*CHRNE*	Homozygous	c.1327del p.Glu443Lysfs*64 (11267delG, exon 12/12)	/
66	*CHRNE*	Homozygous	c.130dupG p.Glu44Glyfs*3 (70insG, exon 2/12)	/
67	*CHRNE*	Compound heterozygous	c.980A>T p.Asn327Ile (N307I, exon 9/12)	c.1353dupG p.Asn452Glufs*4 (1293insG, exon 12/12)
68	*CHRNE*	Homozygous	c.1353dupG p.Asn452Glufs*4 (1293insG, exon 12/12)	/
69	*CHRNE*	Homozygous	c.130dupG p.Glu44Glyfs*3 (70insG, exon 2/12)	/
70	*CHRNE*	Homozygous	c.1327del p.Glu443Lysfs*64 (11267delG, exon 12/12)	/
71	*CHRNE*	Homozygous	c.1327del p.Glu443Lysfs*64 (11267delG, exon 12/12)	/
72	*CHRNE*	Compound heterozygous	c.239_258delinsT p.Trp80Phefs*10 (exon 4/12)	c.501-16G>A with alternative splicing (intron 5/11)
73	*CHRNE*	Homozygous	c.1353dupG p.Asn452Glufs*4 (1293insG, exon 12/12)	/
74	*CHRNE*	Homozygous	c.130dupG p.Glu44Glyfs*3 (70insG, exon 2/12)	/
75	*CHRNE*	Compound heterozygous	c.905C>G p.Pro302Arg	c.601+2T>A

76	*CHRNE*	Compound heterozygous	c.130dupG p.Glu44Glyfs*3 (70insG, exon 2/12)	c.1327-1G>A (intron 11/11)
77	*CHRNE*	Homozygous	c.1327del p.Glu443Lysfs*64 (11267delG, exon 12/12)	/
78	*CHRNE*	Compound heterozygous	c.130dupG p.Glu44Glyfs*3 (70insG, exon 2/12)	c.1353dupG p.Asn452Glufs*4 (1293insG, exon 12/12)
79	*CHRNE*	Homozygous	c.1353dupG p.Asn452Glufs*4 (1293insG, exon 12/12)	/
80	*CHRNE*	Compound heterozygous	c.130dupG p.Glu44Glyfs*3 (70insG, exon 2/12)	c.601+1G>A p.? (intron 6)
81	*CHRNE*	Homozygous	c.535A>C p.Thr179Pro (T159P, exon 6)	/
82	*CHRNE*	Homozygous	c.310_328dup (exon 4)	/
83	*CHRNE*	Homozygous	c.1353dupG p.Asn452Glufs*4 (1293insG, exon 12/12)	/
84	*CHRNE*	Homozygous	c.1353dupG p.Asn452Glufs*4 (1293insG, exon 12/12)	/
85	*CHRNE*	Homozygous	c.1327del p.Glu443Lysfs*64 (11267delG, exon 12/12)	/
86	*CHRNE*	Homozygous	c.712C>T p.Arg238Trp (R218W, exon 7/12)	/
87	*CHRNE*	Compound heterozygous	c.130dupG p.Glu44Glyfs*3 (70insG, exon 2/12)	c.1353dupG p.Asn452Glufs*4 (1293insG, exon 12/12)
88	*CHRNE*	Homozygous	c.1353dupG p.Asn452Glufs*4 (1293insG, exon 12/12)	/
89	*CHRNE*	Homozygous	c.1353dupG p.Asn452Glufs*4 (1293insG, exon 12/12)	/
90	*CHRNE*	Homozygous	c.1353dupG p.Asn452Glufs*4 (1293insG, exon 12/12)	/
91	*CHRNE*	Homozygous	c.1353dupG p.Asn452Glufs*4 (1293insG, exon 12/12)	/
92	*CHRNE*	Homozygous	c.1353dupG p.Asn452Glufs*4 (1293insG, exon 12/12)	/
93	*CHRNE*	Compound heterozygous	c.311T>C p.Leu104Pro (L104P, exon4/12)	c.929T>C p.Phe310Ser (F310S, exon 9/12)
94	*CHRNE*	Homozygous	c.1353dupG p.Asn452Glufs*4 (1293insG, exon 12/12)	/
95	*CHRNE (FCCMS)*	Homozygous	c.1291 G>C p.Ala431Pro (A431P, exon 11/12)	/
96	*CHRNE (FCCMS)*	Homozygous	c.1291 G>C p.Ala431Pro (A431P, exon 11/12)	/
97	*CHRNE (FCCMS)*	Homozygous	c.1291 G>C p.Ala431Pro (A431P, exon 11/12)	/
98	*CHRNE (FCCMS)*	Compound heterozygous	c.587_588 del CA (exon 6/12)	c.583G>A p.Asp195Asn (exon 6/12)
99	*COLQ*	Homozygous	c.1289A>C p.Tyr430Ser (Y430S, exon 16/17)	/
100	*COLQ*	Compound heterozygous	c.1082delC p.Pro361Leufs*65 (exon 15/17)	c.1321A>G p.Ile446Thr (I446T, exon 17/17)
101	*COLQ*	Compound heterozygous	Deletion of exon 1,1b and 2	c.1289A>C p.Tyr430Ser (Y430S, exon 16/17)
102	*COLQ*	Compound heterozygous	c.219+1G>C (intron 2/16)	c.1019G>A p.Arg340His (R340H, exon 14/17)
103	*COLQ*	Compound heterozygous	c.219+1G>C (intron 2/16)	c.1019G>A p.Arg340His (R340H, exon 14/17)
104	*COLQ*	Homozygous	c.1021 A>G p.Arg341Gly (R341G, exon 14/17)	/
105	*COLQ*	Homozygous	c.1289A>C p.Tyr430Ser (Y430S, exon 16/17)	/
106	*COLQ*	Homozygous	c.157dupC p.Leu53Profs*81 (exon 2/17)	/
107	*COLQ*	Compound heterozygous	Deletion of exon 1,1b and 2	c.1289A>C p.Tyr430Ser (Y430S, exon 16/17)
108	*COLQ*	Compound heterozygous	c.107-1G>A (intron 1/16)	c.706C>T p.Arg236Ter (R236X, exon 11/17)
109	*COLQ*	Compound heterozygous	c.1281C>T p.Cys427Cys (C427C, exon 16/17)	c.1289A>C p.Tyr430Ser (Y430S, exon 16/17)
110	*COLQ*	Homozygous	c.1281C>T p.Cys427Cys (C427C, exon 16/17)	/
111	*COLQ*	Compound heterozygous	c.1082delC p.Pro361Leufs*65 (exon 15/17)	c.1321A>G p.Ile446Thr (I446T, exon 17/17)
112	*COLQ*	Compound heterozygous	c.107-1G>A (intron 1/16)	c.788dupC p.Pro265Alafs*37 (exon 12/17)
113	*COLQ*	Homozygous	c.1228C>Tp.Arg410Trp (R410W, exon 16/17)	/

114	*COLQ*	Compound heterozygous	c.1082delC p.Pro361Leufs*65 (exon 15/17)	c.1314C>T p.Arg452Cys
115	*COLQ*	Compound heterozygous	c.1289A>C p.Tyr430Ser (Y430S, exon 16/17)	c.706C>T p.Arg236* R236X (exon 11/17)
116	*COLQ*	Compound heterozygous	c.1289A>C p.Tyr430Ser (Y430S, exon 16/17)	c.706C>T p.Arg236* R236X (exon 11/17)
117	*COLQ*	Homozygous	c.1289A>C p.Tyr430Ser (Y430S, exon 16/17)	/
118	*DOK7*	Compound heterozygous	c.346G>A p.Val116Met (V116M, exon 4/7)	c.1124_1127dupTGCC p.Ala378Serfs*30 (exon 7/7)
119	*DOK7*	Compound heterozygous	c.514G>A p.Gly172Arg (G172R, exon 4/7)	c.1124_1127dupTGCC p.Ala378Serfs*30 (exon 7/7)
120	*DOK7*	Homozygous	c.496 G>A p.Gly166Arg (G166R, exon 4/7)	/
121	*DOK7*	Compound heterozygous	c.54+25_55-38del15 bp (intron 1/6)	c.1124_1127dupTGCC p.Ala378Serfs*30 (exon 7/7)
122	*DOK7*	Compound heterozygous	c.1124_1127dupTGCC p.Ala378Serfs*30 (exon 7/7)	c.1143delC p.Glu382Serfs*74 (exon 7/7)
123	*DOK7*	Compound heterozygous	c.313C>T p.Arg105Cys (R105C, exon 3/7)	c.1124_1127dupTGCC p.Ala378Serfs*30 (exon 7/7)
124	*DOK7*	Homozygous	c.230C>T p.Thr77Met (T77M, exon 3/7)	/
125	*DOK7*	Homozygous	c.1124_1127dupTGCC p.Ala378Serfs*30 (exon 7/7)	/
126	*DOK7*	Compound heterozygous	c.511G>C p.Gly171Arg (G171R, exon 4/7)	c.1124_1127dupTGCC p.Ala378Serfs*30 (exon 7/7)
127	*DOK7*	Compound heterozygous	c.511G>C p.Gly171Arg (G171R, exon 4/7)	c.1124_1127dupTGCC p.Ala378Serfs*30 (exon 7/7)
128	*DOK7*	Homozygous	c.1124_1127dupTGCC p.Ala378Serfs*30 (exon 7/7)	/
129	*DOK7*	Compound heterozygous	c.532+3A>T (intron 4)	c.1124_1127dupTGCC p.Ala378Serfs*30 (exon 7/7)
130	*DOK7*	Compound heterozygous	c.532+3A>T (intron 4)	c.1124_1127dupTGCC p.Ala378Serfs*30 (exon 7/7)
131	*DOK7*	Compound heterozygous	c.514 G>A p.Gly180Val (G180V, exon 4/7)	c.1124_1127dupTGCC p.Ala378Serfs*30 (exon 7/7)
132	*DOK7*	Compound heterozygous	c.470 T>G p.Leu157Arg (L157R, exon 4/7)	c.1124_1127dupTGCC p.Ala378Serfs*30 (exon 7/7)
133	*DOK7*	Compound heterozygous	c.383 C>G p.Pro128Arg (P128R, exon 4/7)	c.1339_1342dupCTGG p.Gly448Alafs*72 (exon 7/7)
134	*DOK7*	Compound heterozygous	c.54+25_55-38del15 bp (intron 1/6)	c.372G>T p.Leu124Phe (L124F, exon 4/7)
135	*DOK7*	Homozygous	c.773-2A>G (intron 6/6)	/
136	*DOK7*	Compound heterozygous	c.7G>A p.Glu3Lys (E3K, exon 1/7)	c.1124_1127dupTGCC p.Ala378Serfs*30 (exon 7/7)
137	*DOK7*	Compound heterozygous	c.1124_1127dupTGCC p.Ala378Serfs*30 (exon 7/7)	c.(?_553)_(*981_?)del = délétion emportant les exons 5 à 7
138	*DOK7*	Compound heterozygous	c.1124_1127dupTGCC p.Ala378Serfs*30 (exon 7/7)	c.1263dupC p.Ser422Leufs*97 (exon 7/7)
139	*DOK7*	Compound heterozygous	c.437C>T p.Pro146Leu (P146L, exon 4/7)	c.1124_1127dupTGCC p.Ala378Serfs*30 (exon 7/7)
140	*DOK7*	Compound heterozygous	c.54+25_55-38del15 bp (intron 1/6)	c.1124_1127dupTGCC p.Ala378Serfs*30 (exon 7/7)
141	*DOK7*	Homozygous	c.1124_1127dupTGCC p.Ala378Serfs*30 (exon 7/7)	/
142	*DOK7*	Compound heterozygous	c.1124_1127dupTGCC p.Ala378Serfs*30 (exon 7/7)	c.1435_1450del (exon 7/7)
143	*DOK7*	Compound heterozygous	c.1124_1127dupTGCC p.Ala378Serfs*30 (exon 7/7)	c.1435_1450del (exon 7/7)
144	*DOK7*	Compound heterozygous	c.1124_1127dupTGCC p.Ala378Serfs*30 (exon 7/7)	c.1378dup p.Gln460Profs*59 (exon 7/7)
145	*DOK7*	Compound heterozygous	c.1124_1127dupTGCC p.Ala378Serfs*30 (exon 7/7)	c.437C>T p.Pro146Leu (exon 4/7)
146	*DOK7*	Homozygous	c.925delG p.Glu309Lys fs*147 (exon 7/7)	/
147	*DOK7*	Compound heterozygous	c.1124_1127dupTGCC p.Ala378Serfs*30 (exon 7/7)	c.55-14C>A, p.Ala378Serfs*30
148	*DOK7*	Compound heterozygous	c.1124_1127dupTGCC p.Ala378Serfs*30 (exon 7/7)	c.473G>A p.Arg158Gln (exon 4)
149	*DOK7*	Homozygous	c.1124_1127dupTGCC p.Ala378Serfs*30 (exon 7/7)	/
150	*DOK7*	Homozygous	c.1431_1445delins14 p.His481AlafsX20 (exon 7/7)	/

151	*DOK7*	Compound heterozygous	c.1124_1127dupTGCC p.Ala378Serfs*30 (exon 7/7)	c.1263dupC p.Ser422Leufs*97 (exon 7/7)
152	*DOK7*	Compound heterozygous	c.1124_1127dupTGCC p.Ala378Serfs*30 (exon 7/7)	c.1332dup p.Gly445TrpfsTer74
153	*DOK7*	Compound heterozygous	c.1124_1127dupTGCC p.Ala378Serfs*30 (exon 7/7)	c.1263dupC p.Ser422Leufs*97 (exon 7/7)
154	*DOK7*	Compound heterozygous	c.1124_1127dupTGCC p.Ala378Serfs*30 (exon 7/7)	c.1263dupC p.Ser422Leufs*97 (exon 7/7)
155	*DOK7*	Compound heterozygous	c.1124_1127dupTGCC p.Ala378Serfs*30 (exon 7/7)	c.101-19A>G (intron 2)
156	*DOK7*	Compound heterozygous	c.392T>C p.Leu131Pro (L131P, exon 4/7)	c.557C>T p.Ser186Leu (S186L, exon 5/7)
157	*DOK7*	Compound heterozygous	c.392T>C p.Leu131Pro (L131P, exon 4/7)	c.557C>T p.Ser186Leu (S186L, exon 5/7)
158	*DOK7*	Homozygous	c.496 G>A p.Gly166Arg (G166R, exon 4/7)	/
159	*DOK7*	Compound heterozygous	c.1124_1127dupTGCC p.Ala378Serfs*30 (exon 7/7)	c.1361_1347del p.Leu454Profs*60
160	*DOK7*	Homozygous	c.773-2_773-1delAG (donor site, intron 6)	/
161	*DOK7*	Compound heterozygous	c.1124_1127dupTGCC p.Ala378Serfs*30 (exon 7/7)	c.1263dupC p.Ser422Leufs*97 (exon 7/7)
162	*DPAGT1*	Compound heterozygous	c.271C>T p.Pro91Ser (P91S, exon 2/9)	c.380_395dup pSer133Ala*64 (exon 3/9)
163	*DPAGT1*	Compound heterozygous	c.731A>G p.Tyr244Cys	c.739C>T p.Arg247Trp
164	*DPAGT1*	Compound heterozygous	c.26dupT p.Met9Ilefs*80	c.739C>T p.Arg247Trp
165	*GFPT1*	Compound heterozygous	c.332G>A p.Arg111His	c.949A>T p.Met317Leu
166	*GFPT1*	Compound heterozygous	c.207 G>A p.Leu69Leu (L69L, exon 3/19)	c.332 G>A p.Arg111His (R111H, exon 3/19)
167	*GFPT1*	Compound heterozygous	c.223+6G>A (intron 6/18)	c.*22C>A (3'UTR)
168	*GFPT1*	Compound heterozygous	c.1174A>C p.Thr392Pro (T392P, exon 13/19)	c.1496T>G p.Met499Arg (M499R, exon 15/19)
169	*GFPT1*	Compound heterozygous	c.331 C>T p.Arg111Cys (R111C, e4/19)	c.2002-1G>C (intron 18/18)
170	*GFPT1*	Compound heterozygous	c.331 C>T p.Arg111Cys (R111C, e4/19)	c.2002-1G>C (intron 18/18)
171	*GFPT1*	Compound heterozygous	Deletion of exon 11 (c.955+1_956-1)_(1051+1_1052-1)del	c.1882A>G p.Ile628Val (I628V,exon 18/19)
172	*GFPT1*	Compound heterozygous	Deletion of exon 11 (c.955+1_956-1)_(1051+1_1052-1)del	c.1882A>G p.Ile628Val (I628V,exon 18/19)
173	*GFPT1*	Compound heterozygous	c.1046A>G p.Asp642His	c.1924G>C, p.Tyr349Cys
174	*GFPT1*	Homozygous	c.44C>T p.Thr15Met (exon 2)	/
175	*GFPT1*	Homozygous	c.44C>T p.Thr15Met (exon 2)	/
176	*GFPT1*	Homozygous	c.331 C>T p.Arg111Cys (R111C, e4/19)	/
177	*GFPT1*	Compound heterozygous	c.332G>A p.Arg111His	c.*22C>A (3'UTR)
178	*GFPT1*	Homozygous	c.1534C>T p.R512W (exon 15/19)	/
179	*GFPT1*	Homozygous	c.331 C>T p.Arg111Cys (R111C, e4/19)	/
180	*GMPPB*	Compound heterozygous	c.464G>A p.Arg155His (R155H, exon 5/9)	c.1045_1046insG p.Ile349Serfs*34 (exon 9/9)
181	*GMPPB*	Compound heterozygous	c. 860G>A p.Arg287Gln (R287Q, exon 8/9)	NM_013334 c.1100G>A p.Gly367Glu (G367E, exon 8)
182	*GMPPB*	Compound heterozygous	c.79G>C p.Asp27His (D27H, exon 1/9)	c.760G>A(p.Val254Met (V254M, exon 7/9)
183	*GMPPB*	Compound heterozygous	c.79G>C p.Asp27His (D27H, exon 1/9)	c.1043_1044insAGA p.Glu348dup
184	*MUSK*	Compound heterozygous	c.220dupC p.Arg74Profs*20 (exon 3/15)	c.2368G>A p.Val790Met (V790M, exon 15/15)
185	*MUSK*	Compound heterozygous	c.203T>G pIle68Ser (I68S, exon 3)	c. 2368G>A p.Val790Met (V790M, exon 15)
186	*MUSK*	Compound heterozygous	c.467delA p.Lys156Argfs*20 (exon 4/15)	c.2368G>A p.Val790Met (V790M, exon 15/15)
187	*MUSK*	Compound heterozygous	c.467delA p.Lys156Argfs*20 (exon 4/15)	c.2368G>A p.Val790Met (V790M, exon 15/15)
188	*MUSK*	Compound heterozygous	c.2287G>A p.Ala763Thr (exon 15/15)	c.232C>T P?Arg78Trp (exon 3/15)

189	*MUSK*	Compound heterozygous	c.486+5G>C	c.1931T>C p.Val644Ala (exon 15/15)
190	*MUSK*	Homozygous	c.221G>A p.Arg74Gln (exon 3/15)	/
191	*MUSK*	Compound heterozygous	c.1765G>A p.Ala627Pro (exon 13/15)	c.1879G>C p.Val589Met (exon 14/15)
192	*RAPSN*	Compound heterozygous	c.264C>A p.Asn88Lys (N88K, exon 2/8)	c.493G>A p.Val165Met (V165M, exon 2/8)
193	*RAPSN*	Compound heterozygous	c.264C>A p.Asn88Lys (N88K, exon 2/8)	c.1029_c.1045del p.Glu344Cysfs*127 (exon 7)
194	*RAPSN*	Compound heterozygous	c.264C>A p.Asn88Lys (N88K, exon 2/8)	c.1029_c.1045del p.Glu344Cysfs*127 (exon 7)
195	*RAPSN*	Compound heterozygous	c.264C>A p.Asn88Lys (N88K, exon 2/8)	Deletion of exons 3 to 7
196	*RAPSN*	Compound heterozygous	c.264C>A p.Asn88Lys (N88K, exon 2/8)	c.439G>A p.Glu147Lys (E147K, exon 2/8)
197	*RAPSN*	Homozygous	c.264C>A p.Asn88Lys (N88K, exon 2/8)	/
198	*RAPSN*	Compound heterozygous	c.264C>A p.Asn88Lys (N88K, exon 2/8)	c.130del p.Arg44AlafsX20 (exon 1/8)
199	*RAPSN*	Compound heterozygous	c.264C>A p.Asn88Lys (N88K, exon 2/8)	c.245C>T p.Leu82Pro (L82P, exon 2/8)
200	*RAPSN*	Compound heterozygous	c.264C>A p.Asn88Lys (N88K, exon 2/8)	c.493G>A p.Val165Met (V165M, exon 2/8)
201	*RAPSN*	Compound heterozygous	c.133G>A p.Val45Met (V45M, exon 1/8)	c.848T>C p.Leu283Pro (L283P, exon 5/8)
202	*RAPSN*	Homozygous	c.264C>A p.Asn88Lys (N88K, exon 2/8)	/
203	*RAPSN*	Homozygous	c.264C>A p.Asn88Lys (N88K, exon 2/8)	/
204	*RAPSN*	Homozygous	c.264C>A p.Asn88Lys (N88K, exon 2/8)	/
205	*RAPSN*	Compound heterozygous	c.264C>A p.Asn88Lys (N88K, exon 2/8)	c.491G>A p.Arg164His (R164H, exon 2/8)
206	*RAPSN*	Homozygous	c.264C>A p.Asn88Lys (N88K, exon 2/8)	/
207	*RAPSN*	Compound heterozygous	c.264C>A p.Asn88Lys (N88K, exon 2/8)	c.493G>A p.Val165Met (V165M, exon 2/8)
208	*RAPSN*	Compound heterozygous	c.264C>A p.Asn88Lys (N88K, exon 2/8)	c.439G>A p.Glu147Lys (E147K, exon 2/8)
209	*RAPSN*	Homozygous	c.264C>A p.Asn88Lys (N88K, exon 2/8)	/
210	*RAPSN*	Compound heterozygous	c.264C>A p.Asn88Lys (N88K, exon 2/8)	c.1083_1084dupCT p.Tyr362Serfs*10 (exon 7/8)
211	*RAPSN*	Compound heterozygous	c.258C>A p.Tyr86* (Y86X, exon 2/8)	c.264C>A p.Asn88Lys (N88K, exon 2/8)
212	*RAPSN*	Homozygous	c.264C>A p.Asn88Lys (N88K, exon 2/8)	/
213	*RAPSN*	Homozygous	c.-210A>T	/
214	*RAPSN*	Homozygous	c.264C>A p.Asn88Lys (N88K, exon 2/8)	/
215	*RAPSN*	Homozygous	c.264C>A p.Asn88Lys (N88K, exon 2/8)	/
216	*RAPSN*	Homozygous	c.264C>A p.Asn88Lys (N88K, exon 2/8)	/
217	*RAPSN*	Homozygous	c.264C>A p.Asn88Lys (N88K, exon 2/8)	/
218	*RAPSN*	Homozygous	c.264C>A p.Asn88Lys (N88K, exon 2/8)	/
219	*RAPSN*	Compound heterozygous	c.264C>A p.Asn88Lys (N88K, exon 2/8)	Deletion of exons 7 and 8
220	*RAPSN*	Compound heterozygous	c.264C>A p.Asn88Lys (N88K, exon 2/8)	Deletion of exons 1 and 2
221	*RAPSN*	Compound heterozygous	c.264C>A p.Asn88Lys (N88K, exon 2/8)	c.285G>T p.Lys95Asn
222	*RAPSN*	Compound heterozygous	c.264C>A p.Asn88Lys (N88K, exon 2/8)	c.691-2A>G
223	*RAPSN*	Compound heterozygous	c.264C>A p.Asn88Lys (N88K, exon 2/8)	c.484 G>A p.Glu162Lys (exon 2/12)
224	*RAPSN*	Homozygous	c.264C>A p.Asn88Lys (N88K, exon 2/8)	/
225	*TOR1AIP*	Homozygous	c.63dupC p.Arg22Glnfs*88 (exon 1/10)	/
226	*TOR1AIP*	Compound heterozygous	c.63dupC p.Arg22Glnfs*88 (exon 1/10)	c.72dupC p.Ile25Hisfs*85
227	*TOR1AIP*	Compound heterozygous	c.63dupC p.Arg22Glnfs*88 (exon 1/10)	c.72dupC p.Ile25Hisfs*86
228	*COL13A1*	Homozygous	c.294+1G>A p.? (intron 1)	/

229	*SCN4A*	Homozygous	c.4949C>T p.Pro1650Leu (exon 24)	/
230	*LRP4*	Homozygous	c.1820A>G p.Tyr607Cys (exon 14)	/
231	*SLC5A7*	Compound heterozygous	c.194G>A p.Gly65Glu (exon 3)	c.313C>T p.Pro105Ser (exon 4)
232	*SLC5A7*	Homozygous	c.1082G>A p.Arg361Gln (exon 8)	/
233	*CHAT*	Compound heterozygous	c.[205C>A;556C>T] p.[Pro69Thr;Arg186Trp]	c.1267G>A p.Asp423Asn
234	*CHAT*	Compound heterozygous	c.[205C>A;556C>T] p.[Pro69Thr;Arg186Trp]	c.1267G>A p.Asp423Asn
235	*CHAT/SLC18A3*	Compound heterozygous	Deletion encompassing *CHAT* and *SCL18A3* genes	c.154G>T p.Val52Phe (V52F, unique exon of *SCL18A3*)

Supplementary Table 2: Clinical, paraclinical, long-term prognosis and treatment data of *CHRNE*-LE patients

	Number of patients (% of patients)	**Mean (SD)**
Number of patients	56	
Age at first symptoms (years)		2 (3.5)
Initial phenotype		
Fatigability	53/54 (98.1%)	
Proximal weakness	37/56 (66%)	
Distal weakness	16/55 (29.1%)	
Axial muscle weakness	24/40 (60%)	
Ptosis	53/54 (98.1%)	
Ophthalmoparesis	46/54 (85.2%)	
Facial weakness	12/53 (22.6%)	
Bulbar symptoms	31/54 (57,4%)	
Respiratory symptoms	16/54 (29.7%)	
Sudden childhood respiratory insufficiency	13/54 (24.1%)	
Scoliosis	4/54 (7.4%)	
Contractures	0/54 (0%)	
Arthrogryposis	0/54 (0%)	
Intellectual disability	0/54 (0%)	
Delayed motor milestones	10/52 (19.2%)	
Neonatal hypotonia	8/56 (14.2%)	
CK		
Patients with elevated CK	3/30 (10%)	
CK value (UI/L)		136.8 (94.8)
ENMG		
Decrement on 3-Hz RNS	49/51 (96.1%)	
Post-exercise increment	0/51 (0%)	
R-CMAP	1/51 (2.0%)	
Muscle biopsy		
Normal	0/16 (6.3%)	
Type I fibre predominance	9/16 (56.2%)	
Type II fibre atrophy	12/16 (75%)	
Fibre size disproportion	3/16 (18.8%)	
Nuclear internalizations	1/16 (6.3%)	
Lipid surcharge	1/16 (6.3%)	
Mitochondrial abnormalities	2/16 (12.5%)	
Core-like lesions	0/16 (0%)	
Tubular aggregates	0/16 (0%)	
Necrotic/regenerating fibres	0/16 (0%)	
Abnormal NMJ on electron microscopy	5/5 (100%)	
Long-term prognosis		
Exacerbations	15/56 (26.8%)	
ICU admissions	8/56 (14.2%)	
Respiratory assistance	4/56 (7.1%)	
Wheelchair-bound	3/56 (5.3%)	
Both ventilated and wheelchair-bound	1/56 (1.8%)	
MGFA score ≥ 4	5/56 (8.9%)	
Improvement with treatment		
AChE inhibitors	46/53 (86.8%)	
3,4-DAP	23/33 (69.7%)	
Salbutamol	12/16 (75%)	
Ephedrine	NA	
Fluoxetine	NA	
Quinidine	NA	

LE = low-expressor, CK = creatine kinase, ENMG = electroneuromyography, RNS = repetitive nerve stimulation, R-CMAP: repetitive compound muscle action potential, NMJ = neuromuscular junction, ICU = intensive care unit, MGFA = Myasthenia Gravis Foundation of America, AChE = acetylcholine esterase, 3,4-DAP = 3,4-diaminopyridine, NA = not available

Supplementary Table 3: Clinical, paraclinical, long-term prognosis and treatment data of FCCMS patients

	Number of patients (% of patients)	Mean (SD)
Number of patients	4	
Age at first symptoms (years)		3.25 (1.64)
Initial phenotype		
Fatigability	3/3 (100%)	
Proximal weakness	2/4 (50%)	
Distal weakness	0/4 (0%)	
Axial muscle weakness	2/3 (66.7%)	
Ptosis	4/4 (100%)	
Ophthalmospasms	4/4 (100%)	
Facial weakness	0/4 (0%)	
Bulbar symptoms	1/3 (33.3%)	
Respiratory symptoms	0/3 (0%)	
Sudden childhood respiratory insufficiency	0/3 (0%)	
Scoliosis	1/4 (25%)	
Contractures	0/4 (0%)	
Arthrogryposis	0/4 (0%)	
Intellectual disability	0/4 (0%)	
Delayed motor milestones	0/4 (0%)	
Neonatal hypotonia	0/4 (0%)	
CK		
Patients with elevated CK	1/1 (100%)	
CK value (UI/L)		366*
ENMG		
Decrement on 3-Hz RNS	4/4 (100%)	
Post-exercise increment	0/4 (0%)	
R-CMAP	1/4 (25%)	
Muscle biopsy**		
Normal	NA	
Type I fibre predominance	NA	
Type II fibre atrophy	NA	
Fibre size disproportion	NA	
Nuclear internalizations	NA	
Lipid surcharge	NA	
Mitochondrial abnormalities	NA	
Core-like lesions	NA	
Tubular aggregates	NA	
Necrotic/regenerating fibres	NA	
Abnormal NMJ on electron microscopy	NA	
Long-term prognosis		
Exacerbations	0/4 (0%)	
ICU admissions	0/4 (0%)	
Respiratory assistance	0/4 (0%)	
Wheelchair-bound	0/4 (0%)	
Both ventilated and wheelchair-bound	0/4 (0%)	
MGFA score $\geq$ 4	0/4 (0%)	
Improvement with treatment		
AChE inhibitors	4/4 (100%)	
3,4-DAP	1/2 (50%)	
Salbutamol	1/2 (50%)	
Ephedrine	1/1 (100%)	
Fluoxetine	0/1 (0%)	
Quinidine	NA	

FCCMS = fast-channel congenital myasthenic syndrome, CK = creatine kinase, ENMG = electroneuromyography, RNS = repetitive nerve stimulation, R-CMAP = repetitive compound muscle action potential, NMJ = neuromuscular junction, ICU = intensive care unit, MGFA = Myasthenia Gravis Foundation of America, AChE = acetylcholine esterase, 3,4-DAP = 3,4-diaminopyridine, NA = not available

* Only one patient had an available CK value

** No muscle biopsy was performed

Supplementary Table 4: Clinical, paraclinical, long-term prognosis and treatment data of *CHRND* patients

	Number of patients (% of patients)	**Mean (SD)**
Number of patients	4	
Age at first symptoms (years)		10.3 (11.8)
Initial phenotype		
Fatigability	3/4 (75%)	
Proximal weakness	2/4 (50%)	
Distal weakness	1/4 (25%)	
Axial muscle weakness	1/3 (33.3%)	
Ptosis	4/4 (100%)	
Ophthalmoparesis	2/4 (50%)	
Facial weakness	1/4 (25%)	
Bulbar symptoms	2/4 (50%)	
Respiratory symptoms	2/4 (50%)	
Sudden childhood respiratory insufficiency	0/4 (0%)	
Scoliosis	1/4 (25%)	
Contractures	0/4 (0%)	
Arthrogryposis	0/4 (0%)	
Intellectual disability	0/4 (0%)	
Delayed motor milestones	0/4 (0%)	
Neonatal hypotonia	1/4 (25%)	
CK		
Patients with elevated CK	1/1 (100%)	
CK value (UI/L)		218*
ENMG		
Decrement on 3-Hz RNS	4/4 (100%)	
Post-exercise increment	0/4 (0%)	
R-CMAP	0/4 (0%)	
Muscle biopsy		
Normal	2/2 (50%)	
Type I fibre predominance	0/2 (0%)	
Type II fibre atrophy	0/2 (0%)	
Fibre size disproportion	0/2 (0%)	
Nuclear internalizations	0/2 (0%)	
Lipid surcharge	0/2 (0%)	
Mitochondrial abnormalities	0/2 (0%)	
Core-like lesions	0/2 (0%)	
Tubular aggregates	0/2 (0%)	
Necrotic/regenerating fibres	0/2 (0%)	
Abnormal NMJ on electron microscopy	NA	
Long-term prognosis		
Exacerbations	0/4 (0%)	
ICU admissions	0/4 (0%)	
Respiratory assistance	0/4 (0%)	
Wheelchair-bound	0/4 (0%)	
Both ventilated and wheelchair-bound	0/4 (0%)	
MGFA score ≥ 4	0/4 (0%)	
Improvement with treatment		
AChE inhibitors	3/4 (75%)	
3,4-DAP	3/3 (100%)	
Salbutamol	1/1 (100%)	
Ephedrine	0/1 (0%)	
Fluoxetine	NA	
Quinidine	NA	

CK = creatine kinase, ENMG = electroneuromyography, RNS = repetitive nerve stimulation, R-CMAP = repetitive compound muscle action potential, NMJ = neuromuscular junction, ICU = intensive care unit, MGFA = Myasthenia Gravis Foundation of America, AChE = acetylcholine esterase, 3,4-DAP = 3,4-diaminopyridine, NA = not available

* Only one patient had an available CK value

Supplementary Table 5: Clinical, paraclinical, long-term prognosis and treatment data of SCCMS patients

	Number of patients (% of patients)	Mean (SD)
Number of patients	20	
Age at first symptoms (years)		14.4 (14.7)
Initial phenotype		
Fatigability	17/20 (85%)	
Proximal weakness	4/20 (20%)	
Distal weakness	16/20 (80%)	
Axial muscle weakness	7/19 (36.8%)	
Ptosis	12/10 (6%)	
Ophthalmoparesis	8/20 (4%)	
Facial weakness	2/20 (10%)	
Bulbar symptoms	3/20 (15%)	
Respiratory symptoms	5/20 (25%)	
Sudden childhood respiratory insufficiency	2/20 (10%)	
Scoliosis	4/20 (20%)	
Contractures	0/20 (0%)	
Arthrogryposis	0/20 (0%)	
Intellectual disability	0/20 (0%)	
Delayed motor milestones	2/18 (11.1%)	
Neonatal hypotonia	0/20 (0%)	
CK		
Patients with elevated CK	1/6 (16.7%)	
CK value (UI/L)		163.7 (115.3)
ENMG		
Decrement on 3-Hz RNS	17/17 (100%)	
Post-exercise increment	0/17 (0%)	
R-CMAP	15/20 (75%)	
Muscle biopsy		
Normal	1/2 (50%)	
Type I fibre predominance	1/2 (50%)	
Type II fibre atrophy	0/2 (50%)	
Fibre size disproportion	0/2 (50%)	
Nuclear internalizations	0/2 (50%)	
Lipid surcharge	0/2 (50%)	
Mitochondrial abnormalities	0/2 (50%)	
Core-like lesions	0/2 (50%)	
Tubular aggregates	0/2 (50%)	
Necrotic/regenerating fibres	0/2 (50%)	
Abnormal NMJ on electron microscopy	NA	
Long-term prognosis		
Exacerbations	6/20 (30%)	
ICU admissions	4/20 (20%)	
Respiratory assistance	11/20 (55%)	
Wheelchair-bound	2/20 (10%)	
Both ventilated and wheelchair-bound	2/20 (10%)	
MGFA score ≥ 4	2/19 (10.5%)	
Improvement with treatment		
AChE inhibitors	0/5 (0%)	
3,4-DAP	1/2 (50%)	
Salbutamol	2/5 (40%)	
Ephedrine	NA	
Fluoxetine	7/13 (53.8%)	
Quinidine	5/5 (100%)	

SCCMS = slow-channel congenital myasthenic syndrome, CK = creatine kinase, ENMG = electroneuromyography, RNS = repetitive nerve stimulation, R-CMAP = repetitive compound muscle action potential, NMJ = neuromuscular junction, ICU = intensive care unit, MGFA = Myasthenia Gravis Foundation of America, AChE = acetylcholine esterase, 3,4-DAP = 3,4-diaminopyridine, NA = not available

Supplementary Table 6: Clinical, paraclinical, long-term prognosis and treatment data of *MUSK* patients

	Number of patients (% of patients)	**Mean (SD)**
Number of patients	8	
Age at first symptoms (years)		5.8 (13.8)
Initial phenotype		
Fatigability	6/8 (75%)	
Proximal weakness	4/8 (50%)	
Distal weakness	0/8 (0%)	
Axial muscle weakness	2/7 (28.6%)	
Ptosis	5/8 (62.5%)	
Ophthalmoparesis	4/8 (50%)	
Facial weakness	1/8 (12.5%)	
Bulbar symptoms	5/8 (62.5%)	
Respiratory symptoms	5/8 (62.5%)	
Sudden childhood respiratory insufficiency	4/8 (50%)	
Scoliosis	1/8 (12.5%)	
Contractures	0/8 (0%)	
Arthrogryposis	0/8 (0%)	
Intellectual disability	0/8 (0%)	
Delayed motor milestones	2/8 (25%)	
Neonatal hypotonia	2/8 (25%)	
CK		
Patients with elevated CK	3/3 (100%)	
CK value (UI/L)		1822.7 (2371.7)
ENMG		
Decrement on 3-Hz RNS	7/8 (87.5)	
Post-exercise increment	0/8 (0%)	
R-CMAP	0/8 (0%)	
Muscle biopsy		
Normal	0/3 (0%)	
Type I fibre predominance	1/3 (33.3%)	
Type II fibre atrophy	0/3 (0%)	
Fibre size disproportion	0/3 (0%)	
Nuclear internalizations	1/3 (0%)	
Lipid surcharge	1/3 (33.3%)	
Mitochondrial abnormalities	0/3 (0%)	
Core-like lesions	0/3 (0%)	
Tubular aggregates	0/3 (0%)	
Necrotic/regenerating fibres	1/3 (33.3%)	
Abnormal NMJ on electron microscopy	1/1 (100%)	
Long-term prognosis		
Exacerbations	2/8 (25%)	
ICU admissions	4/8 (50%)	
Respiratory assistance	2/8 (25%)	
Wheelchair-bound	1/8 (12.5%)	
Both ventilated and wheelchair-bound	0/8 (0%)	
MGFA score ≥ 4	1/8 (12.5%)	
Improvement with treatment		
AChE inhibitors	1/5 (20%)	
3,4-DAP	1/4 (25%)	
Salbutamol	4/5 (80%)	
Ephedrine	NA	
Fluoxetine	NA	
Quinidine	NA	

CK = creatine kinase, ENMG = electroneuromyography, RNS = repetitive nerve stimulation, R-CMAP = repetitive compound muscle action potential, NMJ = neuromuscular junction, ICU = intensive care unit, MGFA = Myasthenia Gravis Foundation of America, AChE = acetylcholine esterase, 3,4-DAP = 3,4-diaminopyridine, NA = not available

Supplementary Table 7: Clinical, paraclinical, long-term prognosis and treatment data of *AGRN* patients

	Number of patients (% of patients)	**Mean (SD)**
Number of patients	12	
Age at first symptoms (years)		14.8 (12.8)
Initial phenotype		
Fatigability	11/12 (91.7)	
Proximal weakness	6/12 (50%)	
Distal weakness	4/12 (33.3%)	
Axial muscle weakness	2/12 (16.7%)	
Ptosis	2/12 (16.7%)	
Ophthalmoparesis	1/12 (8.3%)	
Facial weakness	4/12 (33.3%)	
Bulbar symptoms	3/12 (25%)	
Respiratory symptoms	5/12 (41.7%)	
Sudden childhood respiratory insufficiency	2/12 (16.7%)	
Scoliosis	1/12 (8.3%)	
Contractures	1/12 (8.3%)	
Arthrogryposis	0/12 (0%)	
Intellectual disability	0/12 (0%)	
Delayed motor milestones	0/12 (0%)	
Neonatal hypotonia	0/12 (0%)	
CK		
Patients with elevated CK	3/9 (33.3%)	
CK value (UI/L)		191 (135.1)
ENMG		
Decrement on 3-Hz RNS	12/12 (100%)	
Post-exercise increment	3/12 (25%)	
R-CMAP	0/12 (0%)	
Muscle biopsy		
Normal	0/6 (0%)	
Type I fibre predominance	4/6 (66.7%)	
Type II fibre atrophy	4/6 (66.7%)	
Fibre size disproportion	2/6 (33.3%)	
Nuclear internalizations	1/6 (16.7%)	
Lipid surcharge	1/6 (16.7%)	
Mitochondrial abnormalities	0/6 (0%)	
Core-like lesions	0/6 (0%)	
Tubular aggregates	0/6 (0%)	
Necrotic/regenerating fibres	0/6 (0%)	
Abnormal NMJ on electron microscopy	NA	
Long-term prognosis		
Exacerbations	3/12 (25%)	
ICU admissions	3/12 (25%)	
Respiratory assistance	3/12 (25%)	
Wheelchair-bound	1/12 (8.3%)	
Both ventilated and wheelchair-bound	1/12 (8.3%)	
MGFA score $\geq$ 4	1/12 (8.3%)	
Improvement with treatment		
AChE inhibitors	1/10 (10%)	
3,4-DAP	0/7 (0%)	
Salbutamol	5/6 (83.3%)	
Ephedrine	5/7 (71.4%)	
Fluoxetine	0/1 (0%)	
Quinidine	NA	

CK = creatine kinase, ENMG = electroneuromyography, RNS = repetitive nerve stimulation, R-CMAP = repetitive compound muscle action potential, NMJ = neuromuscular junction, ICU = intensive care unit, MGFA = Myasthenia Gravis Foundation of America, AChE = acetylcholine esterase, 3,4-DAP = 3,4-diaminopyridine, NA = not available

Supplementary Table 8: Clinical, paraclinical, long-term prognosis and treatment data of *RAPSN* patients

	Number of patients (% of patients)	**Mean (SD)**
Number of patients	33	
Age at first symptoms (years)		7.2 (16.1)
Initial phenotype		
Fatigability	27/29 (93.1%)	
Proximal weakness	25/33 (75.8%)	
Distal weakness	10/31 (32.2%)	
Axial muscle weakness	23/31 (74.2%)	
Ptosis	17/30 (56.7%)	
Ophthalmoparesis	13/30 (43.3%)	
Facial weakness	11/32 (34.3%)	
Bulbar symptoms	16/32 (50%)	
Respiratory symptoms	16/32 (50%)	
Sudden childhood respiratory insufficiency	15/32 (46.9%)	
Scoliosis	12/32 (37.5%)	
Contractures	9/32 (28.1%)	
Arthrogryposis	7/32 (21.9%)	
Intellectual disability	0/32 (0%)	
Delayed motor milestones	6/30 (20%)	
Neonatal hypotonia	11/33 (33.3%)	
CK		
Patients with elevated CK	1/19 (5.2%)	
CK value (UI/L)		105.8 (86.0)
ENMG		
Decrement on 3-Hz RNS	29/31 (93.5%)	
Post-exercise increment	0/29 (0%)	
R-CMAP	2/29 (6.9%)	
Muscle biopsy		
Normal	4/11 (36.4%)	
Type I fibre predominance	2/11 (18.2%)	
Type II fibre atrophy	0/11 (0%)	
Fibre size disproportion	2/11 (18.2%)	
Nuclear internalizations	0/11 (0%)	
Lipid surcharge	3/11 (27.3%)	
Mitochondrial abnormalities	1/11 (9.1%)	
Core-like lesions	1/11 (9.1%)	
Tubular aggregates	0/11 (0%)	
Necrotic/regenerating fibres	0/11 (0%)	
Abnormal NMJ on electron microscopy	1/1 (100%)	
Long-term prognosis		
Exacerbations	11/33 (33.3%)	
ICU admissions	17/31 (54.8%)	
Respiratory assistance	3/33 (9.1%)	
Wheelchair-bound	2/33 (6.1%)	
Both ventilated and wheelchair-bound	2/33 (6.1%)	
MGFA score $\geq$ 4	1/33 (3.0%)	
Improvement with treatment		
AChE inhibitors	28/30 (9.3%)	
3,4-DAP	11/15 (73.3%)	
Salbutamol	4/5 (80%)	
Ephedrine	0/1 (0%)	
Fluoxetine	0/3 (0%)	
Quinidine	NA	

CK = creatine kinase, ENMG = electroneuromyography, RNS = repetitive nerve stimulation, R-CMAP = repetitive compound muscle action potential, NMJ = neuromuscular junction, ICU = intensive care unit, MGFA = Myasthenia Gravis Foundation of America, AChE = acetylcholine esterase, 3,4-DAP = 3,4-diaminopyridine, NA = not available

Supplementary Table 9: Clinical, paraclinical, long-term prognosis and treatment data of *COLQ* patients

	Number of patients (% of patients)	**Mean (SD)**
Number of patients	19	
Age at first symptoms (years)		6.7 (8.4)
Initial phenotype		
Fatigability	19/19 (100%)	
Proximal weakness	18/19 (94.7%)	
Distal weakness	5/18 (27.8%)	
Axial muscle weakness	10/15 (66.7%)	
Ptosis	4/19 (21.1%)	
Ophthalmoparesis	1/19 (5.2%)	
Facial weakness	1/19 (5.2%)	
Bulbar symptoms	2/19 (10.5%)	
Respiratory symptoms	2/19 (10.5%)	
Sudden childhood respiratory insufficiency	2/19 (10.5%)	
Scoliosis	7/18 (38.9%)	
Contractures	2/19 (10.5%)	
Arthrogryposis	0/19 (0%)	
Intellectual disability	0/19 (0%)	
Delayed motor milestones	3/18 (16.7%)	
Neonatal hypotonia	5/19 (26.3%)	
CK		
Patients with elevated CK	1/12 (8.3%)	
CK value (UI/L)		93.1 (57.5)
ENMG		
Decrement on 3-Hz RNS	19/19 (100%)	
Post-exercise increment	0/18 (0%)	
R-CMAP	15/19 (78.9%)	
Muscle biopsy		
Normal	3/16 (18.8%)	
Type I fibre predominance	7/16 (43.8%)	
Type II fibre atrophy	3/16 (18.8%)	
Fibre size disproportion	2/16 (12.5%)	
Nuclear internalizations	2/16 (12.5%)	
Lipid surcharge	2/16 (12.5%)	
Mitochondrial abnormalities	0/16 (0%)	
Core-like lesions	0/16 (0%)	
Tubular aggregates	0/16 (0%)	
Necrotic/regenerating fibres	1/16 (6.3%)	
Abnormal NMJ on electron microscopy	1/1 (100%)	
Long-term prognosis		
Exacerbations	5/19 (26.3%)	
ICU admissions	2/19 (10.5%)	
Respiratory assistance	3/19 (15.8%)	
Wheelchair-bound	2/19 (10.5%)	
Both ventilated and wheelchair-bound	1/19 (5.3%)	
MGFA score ≥ 4	1/19 (5.3%)	
Improvement with treatment		
AChE inhibitors	0/7 (0%)	
3,4-DAP	3/6 (50%)	
Salbutamol	8/10 (80%)	
Ephedrine	7/8 (87.5%)	
Fluoxetine	NA	
Quinidine	NA	

CK = creatine kinase, ENMG = electroneuromyography, RNS = repetitive nerve stimulation, R-CMAP = repetitive compound muscle action potential, NMJ = neuromuscular junction, ICU = intensive care unit, MGFA = Myasthenia Gravis Foundation of America, AChE = acetylcholine esterase, 3,4-DAP = 3,4-diaminopyridine, NA = not available

Supplementary Table 10: Clinical, paraclinical, long-term prognosis and treatment data of *DOK7* patients

	Number of patients (% of patients)	**Mean (SD)**
Number of patients	44	
Age at first symptoms (years)		7.2 (11.4)
Initial phenotype		
Fatigability	33/40 (82.5%)	
Proximal weakness	40/44 (90.9%)	
Distal weakness	5/41 (12.2%)	
Axial muscle weakness	14/31 (45.2%)	
Ptosis	22/44 (50%)	
Ophthalmoparesis	3/44 (6.8%)	
Facial weakness	10/41 (24.4%)	
Bulbar symptoms	13/44 (29.5%)	
Respiratory symptoms	15/44 (34.1%)	
Sudden childhood respiratory insufficiency	9/44 (20.5%)	
Scoliosis	23/44 (52.2%)	
Contractures	5/42 (11.9%)	
Arthrogryposis	0/44 (0%)	
Intellectual disability	0/44 (0%)	
Delayed motor milestones	11/43 (25.6%)	
Neonatal hypotonia	8/44 (18.2%)	
CK		
Patients with elevated CK	7/28 (25%)	
CK value (UI/L)		187.7 (181.3)
ENMG		
Decrement on 3-Hz RNS	39/41 (95.1%)	
Post-exercise increment	0/40 (0%)	
R-CMAP	0/42 (0%)	
Muscle biopsy		
Normal	3/27 (11.1%)	
Type I fibre predominance	14/27 (51.9%)	
Type II fibre atrophy	10/27 (37.0%)	
Fibre size disproportion	8/27 (29.6%)	
Nuclear internalizations	1/27 (3.7%)	
Lipid surcharge	4/27 (14.8%)	
Mitochondrial abnormalities	1/27 (3.7%)	
Core-like lesions	3/27 (11.1%)	
Tubular aggregates	0/27 (0%)	
Necrotic/regenerating fibres	0/27 (0%)	
Abnormal NMJ on electron microscopy	1/2 (50%)	
Long-term prognosis		
Exacerbations	15/44 (34.1%)	
ICU admissions	17/44 (38.6%)	
Respiratory assistance	16/44 (36.3%)	
Wheelchair-bound	16/44 (36.3%)	
Both ventilated and wheelchair-bound	9/44 (20.5%)	
MGFA score ≥ 4	12/44 (27.2%)	
Improvement with treatment		
AChE inhibitors	0/23 (0%)	
3,4-DAP	23/33 (69.7%)	
Salbutamol	20/22 (90?9%)	
Ephedrine	22/23 (95.7%)	
Fluoxetine	NA	
Quinidine	NA	

CK = creatine kinase, ENMG = electroneuromyography, RNS = repetitive nerve stimulation, R-CMAP = repetitive compound muscle action potential, NMJ = neuromuscular junction, ICU = intensive care unit, MGFA = Myasthenia Gravis Foundation of America, AChE = acetylcholine esterase, 3,4-DAP = 3,4-diaminopyridine, NA = not available

Supplementary Table 11: Clinical, paraclinical, long-term prognosis and treatment data of *GFPT1* patients

	Number of patients (% of patients)	**Mean (SD)**
Number of patients	15	
Age at first symptoms (years)		6.1 (6.2)
Initial phenotype		
Fatigability	15/15 (100%)	
Proximal weakness	15/15 (100%)	
Distal weakness	1/14 (7.1%)	
Axial muscle weakness	6/6 (100%)	
Ptosis	2/15 (13.3%)	
Ophthalmoparesis	1/15 (6.7%)	
Facial weakness	0/15 (0%)	
Bulbar symptoms	0/15 (0%)	
Respiratory symptoms	1/15 (6.7%)	
Sudden childhood respiratory insufficiency	0/15 (0%)	
Scoliosis	2/15 (13.3%)	
Contractures	2/15 (13.3%)	
Arthrogryposis	0/15 (0%)	
Intellectual disability	0/15 (0%)	
Delayed motor milestones	1/14 (7.1%)	
Neonatal hypotonia	0/15 (0%)	
CK		
Patients with elevated CK	7/12 (58.3%)	
CK value (UI/L)		311.5 (238.0)
ENMG		
Decrement on 3-Hz RNS	13/13 (100%)	
Post-exercise increment	0/14 (0%)	
R-CMAP	0/14 (0%)	
Muscle biopsy		
Normal	0/9	
Type I fibre predominance	1/9 (11.1%)	
Type II fibre atrophy	1/9 (11.1%)	
Fibre size disproportion	2/9 (22.2%)	
Nuclear internalizations	2/9 (22.2%)	
Lipid surcharge	1/9 (11.1%)	
Mitochondrial abnormalities	0/9 (0%)	
Core-like lesions	0/9 (0%)	
Tubular aggregates	7/9 (77.8%)	
Necrotic/regenerating fibres	0/9 (0%)	
Abnormal NMJ on electron microscopy	2/3 (66.7%)	
Long-term prognosis		
Exacerbations	1/15 (6.7%)	
ICU admissions	0/15 (0%)	
Respiratory assistance	2/15 (13.3%)	
Wheelchair-bound	3/15 (20%)	
Both ventilated and wheelchair-bound	1/15 (6.7%)	
MGFA score ≥ 4	2/15 (13.3%)	
Improvement with treatment		
AChE inhibitors	13/14 (92.9%)	
3,4-DAP	10/11 (90.9%)	
Salbutamol	6/7 (85.7%)	
Ephedrine	3/3 (100%)	
Fluoxetine	NA	
Quinidine	NA	

CK = creatine kinase, ENMG = electroneuromyography, RNS = repetitive nerve stimulation, R-CMAP = repetitive compound muscle action potential, NMJ = neuromuscular junction, ICU = intensive care unit, MGFA = Myasthenia Gravis Foundation of America, AChE = acetylcholine esterase, 3,4-DAP = 3,4-diaminopyridine, NA = not available

Supplementary Table 12: Clinical, paraclinical, long-term prognosis and treatment data of *GMPPB* patients

	Number of patients (% of patients)	**Mean (SD)**
Number of patients	4	
Age at first symptoms (years)		11 (10.5)
Initial phenotype		
Fatigability	3/3 (100%)	
Proximal weakness	4/4 (100%)	
Distal weakness	0/4 (0%)	
Axial muscle weakness	2/4 (50%)	
Ptosis	0/4 (0%)	
Ophthalmoparesis	0/4 (0%)	
Facial weakness	1/4 (25%)	
Bulbar symptoms	1/4 (25%)	
Respiratory symptoms	1/4 (25%)	
Sudden childhood respiratory insufficiency	0/4 (0%)	
Scoliosis	1/4 (25%)	
Contractures	1/4 (25%)	
Arthrogryposis	0/4 (0%)	
Intellectual disability	1/4 (25%)	
Delayed motor milestones	2/4 (50%)	
Neonatal hypotonia	0/4	
CK		
Patients with elevated CK	4/4 (100%)	
CK value (UI/L)		2035.3 (1291.8)
ENMG		
Decrement on 3-Hz RNS	4/4 (100%)	
Post-exercise increment	0/4 (0%)	
R-CMAP	0/4 (0%)	
Muscle biopsy		
Normal	0/4 (0%)	
Type I fibre predominance	2/4 (50%)	
Type II fibre atrophy	0/4 (0%)	
Fibre size disproportion	0/4 (0%)	
Nuclear internalizations	1/4 (25%)	
Lipid surcharge	0/4 (0%)	
Mitochondrial abnormalities	0/4 (0%)	
Core-like lesions	0/4 (0%)	
Tubular aggregates	0/4 (0%)	
Necrotic/regenerating fibres	4/4 (100%)	
Abnormal NMJ on electron microscopy	NA	
Long-term prognosis		
Exacerbations	1/4 (25%)	
ICU admissions	0/4 (0%)	
Respiratory assistance	0/4 (0%)	
Wheelchair-bound	1/4 (25%)	
Both ventilated and wheelchair-bound	0/4 (0%)	
MGFA score $\geq$ 4	1/4 (25%)	
Improvement with treatment		
AChE inhibitors	3/4 (75%)	
3,4-DAP	NA	
Salbutamol	1/1 (100%)	
Ephedrine	NA	
Fluoxetine	NA	
Quinidine	NA	

CK = creatine kinase, ENMG = electroneuromyography, RNS = repetitive nerve stimulation, R-CMAP = repetitive compound muscle action potential, NMJ = neuromuscular junction, ICU = intensive care unit, MGFA = Myasthenia Gravis Foundation of America, AChE = acetylcholine esterase, 3,4-DAP = 3,4-diaminopyridine, NA = not available

Supplementary Table 13 Clinical characteristics and long-term prognosis of patients with rare genotypes (n ≤ 3)

Patient	Gene	Sex	Age at first symptoms	First symptoms	Disease course	ICU admission (age in years)	Wheelchair at last visit	Respiratory assistance at last visit (type)	Treatment response	Other features
1	*TOR1AIP1*	F	25	Gowers' sign, axial muscle weakness, fatigability	Stable	No	No	No	AChE inhibitors (+)	Small stature
2	*TOR1AIP1*	M	10	Fatigability, difficulties in sports activities	Worsening	Yes (47)	No	Yes (NIV)	AChE inhibitors (+)	Contractures
3	*TOR1AIP1*	M	10	Fatigability, difficulties in sports activities	Stable	Yes (48)	No	Yes (NIV)	NA	Contractures
4	*DPAGT1*	F	0	Neonatal hypotonia and respiratory insufficiency	Stable	No	No	No	AChE inhibitors (-)	Contractures
5	*DPAGT1*	F	0	Neonatal hypotonia	Worsening	No	Yes	No	AChE inhibitors (+)	Contractures, delayed motor milestones, intellectual disability, optic disk atrophy, epilepsy, deafness, cerebellar ataxia
6	*DPAGT1*	F	0	Neonatal hypotonia	Worsening	Yes (18)	Yes	No	AChE inhibitors (+)	Contractures, delayed motor milestones, intellectual disability, optic disk atrophy, epilepsy
7	*SLC5A7*	M	0	Neonatal hypotonia respiratory insufficiency, sudden apnoea	Improvement	Yes (0)	No	No	AChE inhibitors (+)	/
8	*SLC5A7*	M	0	Neonatal hypotonia and respiratory insufficiency	Worsening	Yes (0)	Yes	Yes (tracheotomy)	AChE inhibitors (+)	Arthrogryposis (equinovarus), epilepsy
9	*CHAT*	M	4	Episodic apnoea, limb muscle weakness	Improvement	No	No	No	AChE inhibitors, 3,4-DAP (+)	Delayed motor milestones, learning difficulties
10	*CHAT*	M	2	Episodic apnoea, limb muscle weakness	Improvement	No	No	No	AChE inhibitors, 3,4-DAP (+)	Delayed motor milestones, learning difficulties
11	*SLC18A3/CHAT*	F	0	Neonatal hypotonia, episodic apnoea, feeding difficulties, ptosis, ophthalmoparesis	Improvement	Yes (0)	No	No	AChE inhibitors (+)	/

12	*CHRNA1*	M	0	Feeding difficulties, proximal muscle weakness	Worsening	No	Yes	No	AChE inhibitors (+)	Jaw malformation, and arthrogryposis (equinovarus)
13	*CHRNB1*	F	0	Neonatal respiratory insufficiency, ptosis, ophthalmoparesis	Stable	Yes (0)	No	No	AChE inhibitors, 3,4-DAP (+)	/
14	*COL13A1*	F	10	Axial muscle weakness, scoliosis, fatigability, bulbar symptoms	Stable	No	No	No	AChE inhibitors, 3,4-DAP (/)	Retrognathia and low-set ears
15	*LRP4*	F	19	Fatigability, muscle weakness	Worsening	No	No	No	AChE inhibitors, salbutamol (-)	Cenani-Lenz syndrome
16	*SCNA4*	F	0	Neonatal hypotonia, muscle weakness, bulbar symptoms	Stable	No	No	No	AChE inhibitors, 3,4-DAP (/)	Small stature

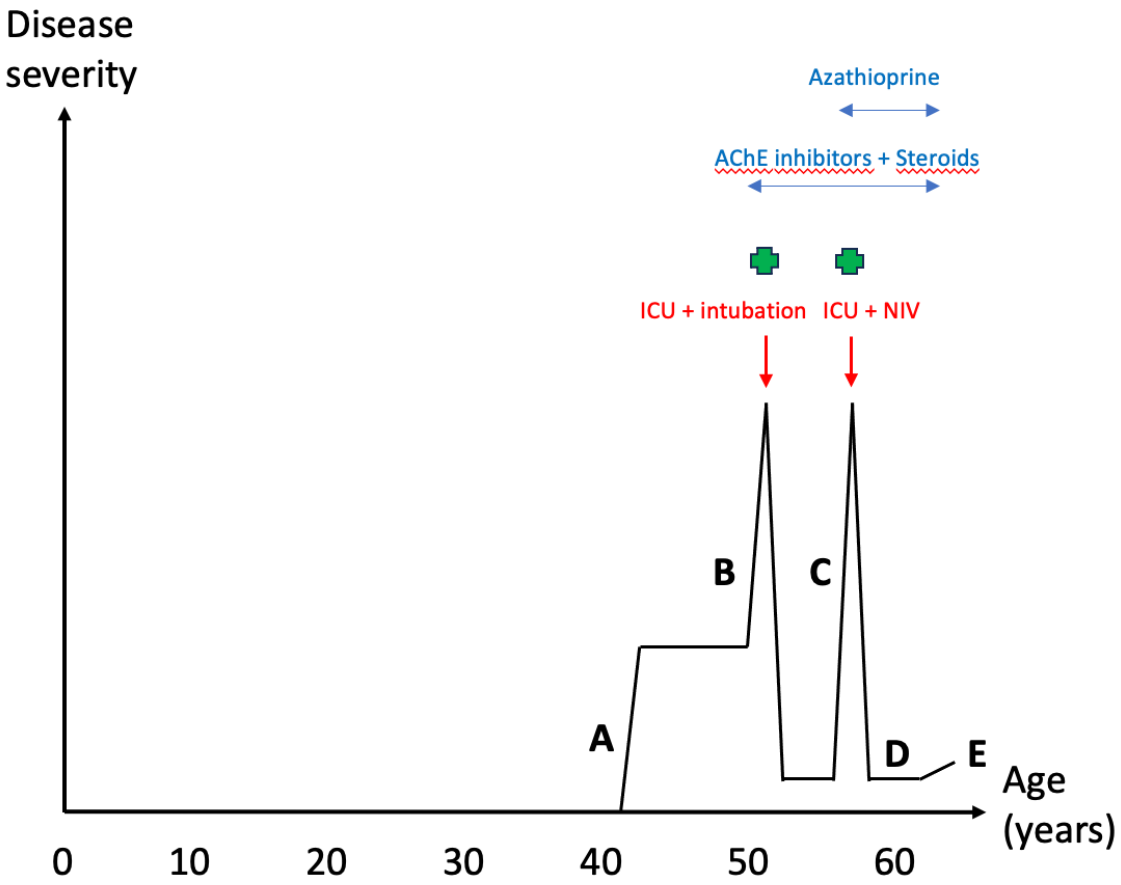
Treatment response: (+) = improvement; (/) = no effect; (-) = worsening.

F = female; M = male; ICU = intensive care unit; AChE = acetylcholinesterase; 3,4-DAP = 3, 4-diaminopyridine; NIV = non-invasive ventilation; NA = not available.

Supplementary Table 14: Paraclinical findings of patients with rare genotypes (n ≤ 3)

Patient	**Gene**	**Sex**	**Age at first symptoms**	**Elevated CK level: Yes/No (value; UI/L)**	**ENMG:** - Decrement on 3-Hz RNS - Post-exercise increment - R-CMAP	**Muscle biopsy**
1	*TOR1AIP1*	F	25	No (NA)	- Yes - Yes - No	Fibre size disproportion Nuclear internalizations
2	*TOR1AIP1*	M	10	Yes (227)	- Yes - Yes - No	NA
3	*TOR1AIP1*	M	10	No (NA)	- Yes - Yes - No	NA
4	*DPAGT1*	F	0	No (97)	- Yes - Yes - No	Tubular aggregates
5	*DPAGT1*	F	0	No (100)	- Yes - Yes - No	Type I fibre predominance Mitochondrial abnormalities
6	*DPAGT1*	F	0	No (73)	- Yes - Yes - No	Type I fibre predominance Lipid surcharge
7	*SLC5A7*	M	0	No (NA)	- Yes - Yes - No	Normal
8	*SLC5A7*	M	0	NA	- Yes - Yes - No	NA
9	*CHAT*	M	4	NA	- Yes - Yes - No	Normal
10	*CHAT*	M	2	NA	- Yes - Yes - No	NA
11	*SLC18A3/CHAT*	F	0	NA	- Yes - Yes - No	Normal
12	*CHRNA1*	M	0	NA	- Yes - Yes - No	NA
13	*CHRNB1*	F	0	NA	- Yes - Yes - No	NA
14	*COL13A1*	F	10	NA	- Yes - Yes - No	NA
15	*LRP4*	F	19	Yes (233)	- Yes - Yes - No	NA
16	*SCNA4*	F	0	No (42)	- Yes - Yes - No	Type I fibre predominance Fibre size disproportion

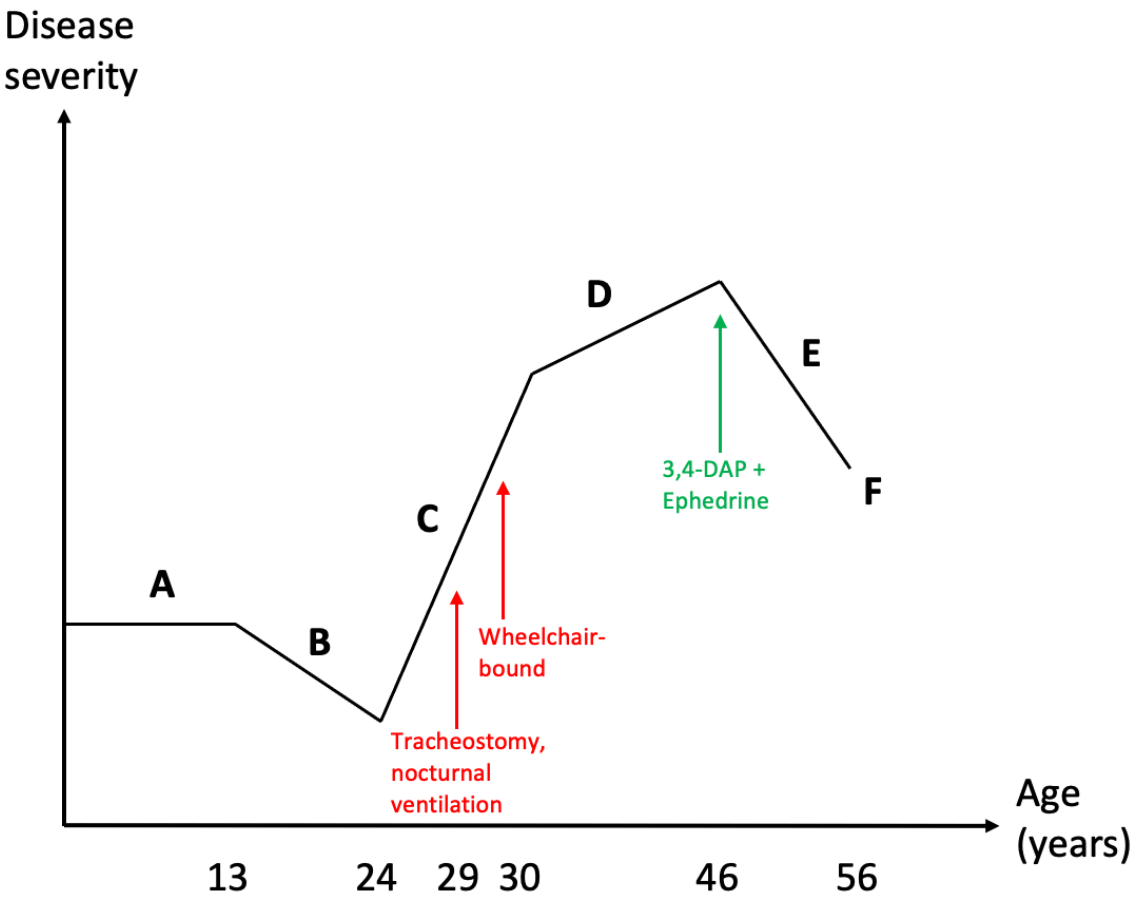
CK = creatine kinase, ENMG = electroneuromyography, RNS = repetitive nerve stimulation, R-CMAP = repetitive compound muscle action potential, NA = not available.



Supplementary Figure 1: A representative DOK7 patient with late-onset and misdiagnosed as myasthenia gravis.

(**A**): At 42, the patient developed a drop-head, and ptosis and complained of fatigue. (**B**): At 50, he presented an acute respiratory failure requiring ICU admission and oral intubation. The patient received intravenous immunoglobulins and acetylcholinesterase inhibitors associated with oral corticosteroids were started. (**C**): At 55, he presented a second respiratory failure requiring ICU admission and non-invasive ventilation, and received a new intravenous immunoglobin infusion. Azathioprine was started. (**D**): Stability was reached at 58, with residual ptosis and neck muscle weakness. (**E**): He developed progressive respiratory symptoms. The genetic diagnosis of congenital myasthenic syndrome was made, and immunomodulatory treatments were stopped.

ICU: intensive care unit, NVI: non-invasive ventilation, AChE: acetylcholinesterase. Green cross: intravenous immunoglobulin infusion.



Supplementary Figure 2: A representative DOK7 patient with a multiphasic disease course.

(**A**) After respiratory distress at birth requiring ICU admission, the patient had stable proximal muscle weakness, ptosis, ophthalmoparesis and bulbar symptoms during childhood. (**B**) His proximal muscle weakness progressively improved during his teenage years. (**C**) Since 24 years, he reported a progressive worsening of its symptoms, leading to a tracheostomy with nocturnal ventilation at 29, and he became wheelchair-bound at 30. (**D**): In his forties, his upper limb weakness progressively worsened. (**E**) At 46, the start of 3,4-DAP and ephedrine after the genetic diagnosis allowed an improvement in arm strength and in proximal lower limb strength allowing him to walk 30 meters. (**F**) He died at 56 after falling down the stairs.