| **No** | **Study** | **Country** | **Ethnicity** | **Disease group** | **No of cases** | **Repeat size in cases** | **No of controls** | **Repeat size in controls** | **Repeat sizing method** | **Cut-off for expansion** | **Remarks** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | Akimoto et al, 2013 | Sweden | Swedish | Atypical PD: MSA, PSP, unclassifiable | 39 (21 MSA, 15 PSP, 3 unclassified) | Mean (sd) 5.1 ± 3.9 (2–17) | 645  | Mean (sd) 5.9 ± 4.7 (2-31) | rp-PCR with fragment length analysis | Saw-tooth pattern used; intermediate defined as >20. | Atypical PD group had mean repeat length ± sd: MSA 4.0 ± 2.7 (range 2–10); PSP 7.1 ± 4.8 (range 2–17); unclassified 3.3 ± 2.3 (range 2–6). 3 PSP cases with >10 repeats. |
| 2 | Cannas et al, 2015 | Sardinia, Italy | Sardinian | MSA, PSP, CBD; PD with psychosis; unclassified | 92 (breakdown not given) | <30(4 cases with 20-28 repeats) | 121  | No range given; no short or long expansion | ‘Modified’ rp-PCR followed by typical ‘sizing PCR’ | Pathogenic >30; 20-29 for intermediate range | Intermediate repeat expansions (20–30 repeats) found in 4 (4.3%) female patients (20, 22, 23, 28 repeats) – 3 with non-classical atypical parkinsonism. Intermediate repeats (20–29) more frequent in cases than controls (p<0.034). |
| 3 | DeJesus-Hernandez et al, 2013 | USA | Caucasian |  ET | 106 | Median 8 (4-24) | 1356 | 2-23 | Fluorescent-labelled PCR with capillary electrophoresis | Not specified, presumed >30 | No evidence of association between repeat length and risk of PD, ET or RLS after correction for multiple testing (P<0.0028). No significant association with repeat length and age-at-onset in any of the 3 disorders (all p≥0.24). |
| RLS | 280 | Median 8 (4-28) |
| 4 | Geiger et al, 2016 | USA | Caucasian | Path-confirmed DLB | 111 | <20 | None | - | rp-PCR | >30 |  |
| 5 | He et al, 2016 | China | Han Chinese | Sporadic ataxia (SCA)  | 411 | 2-15 | 314  | 2-13 | rp-PCR | >30 | Negative for: SCA 1, 2, 3, 6, 7, 8, 10, 12, 17, 35, and DRPLA. No sig difference in repeat distribution between cases and controls (p=0.076). |
| 6 | Kun-Rodrigues et al, 2016 | Multicentre (North America & Europe) | Caucasian | Path-diagnosed DLB | 1398 | Mean (sd) 5.17 ± 4.30 (1-58) | None | - | rp-PCR | >~32 | All except 5 samples had <23 repeats. Two pathologically –diagnosed DLB samples had 32 repeats, 1 had 33 repeats; 2 clinically diagnosed samples had 33 and 58 repeats. |
| 7 | Lesage et al, 2013 | France | French | PSP | 123 | 26 & 30 repeats in 2 subjects | 445 | Mean (sd) 4.5 ± 3.3 (2-22) | rp-PCR and fragment lengthanalysis. Southern blot in expansion carriers and intermediate alleles | ≥60 |  |
| CBS | 21 | Not specified; presumed <26Not specified; presumed <26 |
| DLB | 43 |
| MSA-Parkinsonism | 25 |
| 8 | Lin et al, 2014 | Taiwan | Han Chinese  | PD, FTD, AD, atypical parkinsonism | 482  | 2-25  | 485 | 2-25 | 2-step rp-PCR  | Pathogenic >30; intermediate 20-29 | Atypical parkinsonism: 51 MSA, 14 PSP, 2 CBS, 3 DLB, 8 others. One young-onset typical PD case had 25 repeats, and 1 control with 21 repeats.  |
| 9 | Nuytemans et al, 2013  | USA | Non-Hispanic Caucasians | Essential tremor with parkinsonism (ETP) | 12 | 1 ET with >20 repeats | 1144 | <23 | rp-PCR and fragment length analysis | Intermediate: >20–30+; large >30 | Overall, 14 cases (13 PD, 1 ETP) and 3 controls had >20 repeats (p=0.002). 7 cases and no controls had >23 repeats (p=0.003). C9ORF72 intermediate repeats may contribute to risk for PD and ETP. |
| 10 | Scholz et al, 2015 | UK and USA | Not specified | Path-confirmed MSA cases | 100 | 0-12 | None | - | rp-PCR and fragment length analysis | >30 | No pathogenic repeat identified. |
| 11 | Schottlaender et al, 2015 | UK | British | Path-confirmed MSA | 96 | 2-22 | 7579 | 11 with expanded repeats | rp-PCR; fragment length analysis. Southern blot for expanded and intermediate repeats. | Not specified | 1 typical PSP with 27 repeats had family history of dementia and PD. Unable to confirm segregation in this family. |
| Clinical CBS | 37 | 3 with expansions |
| Clinical PSP | 22 | 1 with 27 repeats  |
| 12 | Yeh et al, 2013 | Taiwan | Han Chinese | DLB | 34 | Mean (sd) 4.97 ± 3.37 (1-15) | 100 | Mean (sd) 4.23 ± 3.08 (1-17) | Fluorescent rp-PCR | Not specified |  |
| PSP | 35 | Mean (sd)4.71 ± 2.62 (1-10) |
| CBS | 13 | Mean (sd) 3.46 ± 2.54 (1-9) |
| 13 | Ogaki et al, 2013 | Japan | Japanese | PSP | 25 | For all cases, mean (sd) 3.77 ±2.56 (2-11 repeats) | None | - | Not mentioned | rp-PCR | No C9ORF72 expansion detected. Study was mainly focused on reporting MAPT and GRN mutation carriers. |
| CBS  | 12 |
| 14 | Wang et al, 2015 | China | Han Chinese | SCA3/Machado-Joseph Disease | 127 | Mean (sd) 6 ± 3 (2-18); 45.22% with intermediate alleles | 314 | Mean (sd) 5 ± 3; 52.76% with intermediate alleles | rp-PCR and FAM-fluorescent labelled PCR assay | >30 used; Intermediate defined as 7-29 | No statistically significant difference in range of intermediate alleles between SCA3 and control. But larger G4C2 repeats associated with earlier age at onset of SCA3/MJD. |

Supplementary Table 4. PD = Parkinson’s disease; MSA = multiple system atrophy; PSP = progressive supranuclear palsy; rp-PCR = repeat-primed polymerase chain reaction; CBD = corticobasal degeneration; ET = essential tremor; RLS = restless legs syndrome; DLB = diffuse lewy body dementia; SCA = spinocerebellar ataxia; CBS = corticobasal syndrome; FTD = frontotemporal dementia; AD = Alzheimer’s disease; ETP = essential tremor with parkinsonism.