Supplemental Figure S3. Alignment of ICL centrin sub-families of *Paramecium*.

The 35 centrin isoforms were aligned by CLUSTALW and are visualized by BOXSHADE.

The different accession numbers of *Paramecium* centrins (named Ptcen_icl or Ptcen) are listed in Table 1.

```
Ptcen_icl1a    1 ------------------------------------------------------MARRGQQPPPQ---APPAQKNQPGKFNPAEFVK
Ptcen_icl1d    1 ------------------------------------------------------MARRGQQPPPQ---APPAQKNQTGKFNPAEFVK
Ptcen_icl1b    1 ------------------------------------------------------MSRRGQQPPPQQQAPP-QKNQAGKFNPAEFVK
Ptcen_icl1c    1 ------------------------------------------------------MARRGQQPPPQQQAPPTQKNQAGKFNPAEFVK
Ptcen_icl1f    1 ------------------------------------------------------MARRGQQPPPQQQAQPAQKNQAGKFNPAEFVK
Ptcen8         1 ----------------------------------------------------MRSKAQAAPVTQKQQPQKQGNVRKPQER
Ptcen15        1 ----------------------------------------------------MRGKQQAAPVTQKQQPQKQGNVRKPQER
Ptcen10        1 ----------------------------------------------------MRAKPQQVAQKQQPQKQGNVRKPQER
Ptcen12        1 ----------------------------------------------------MRGKPAQVAQKQQPQKQGNARKPQER
Ptcen_icl1e    1 ----------------------------------------------------MSKKQAPVAQKPVGKQQQVNRKPQDR
Ptcen_icl1g    1 ----------------------------------------------------MSKKQAPVAQKPVGKQQQVNRKPQDR
Ptcen18        1 ----------------------------------------------------MNRKQAPVAQKPVGKQQQVSRKQQDR
Ptcen_icl5a    1 --------------------------------------------------MSRTNKQVEQPAPNKKVQAP--AKPQKPKE
Ptcen_icl5b    1 --------------------------------------------------MSRTNKQVESQPVPNKKVQAP--AKPQKPKE
Ptcen_icl6a    1 --------------------------------------------------MSRANKQAEAPAQNNKQKGAPAAKPQKPKE
Ptcen_icl6b    1 --------------------------------------------------MSRANKQAEAPAQNNKQKGAPAAKPQKPKE
Ptcen_icl7a    1 ------------------------------------------------------MNQQILDKDEIALLQKPWVKNH
Ptcen_icl7b    1 ------------------------------------------------------MNQQNLDKDEIALLQKPWVKNH
Ptcen_icl8a    1 ----------------------------------------------------MSRREQIEKDKQALLAKPWVKNH
Ptcen_icl8b    1 ----------------------------------------------------MSRRDQIEKDKQALLAKPWVKNH
Ptcen_icl3a    1 ----------------------------------------MSRQAPSSAQKVDPKRAPPPPPPQ-KGPKPFNAEDFAKP
Ptcen_icl3d    1 ----------------------------------------MSRQAPSSAQKVDPKRAPPPPPPAQKGPKAFNAEDYAKP
Ptcen_icl3e    1 ----------------------------------------MSRQAPQSAQKNDKK--APPPPPPQKGPKPFNAEDYAKP
Ptcen_icl3f    1 -------------------------------------MSRQQNSQKQHPPQPAQGNQQQRNPQPPQPPPKSKVFNAEDYAKP
Ptcen_icl3b    1 ----------------------------------------MRPNPRQQSKKESKNVQQPPPPPPQSKPVQEDKQFNPDNYVR-
Ptcen_icl3g    1 ----------------------------------------MRSNPRSQSKKESKTVQPPPPPPPQ-KPVQEEKQFNPDTYVR-
Ptcen_icl10a   1 ------------------------------------MNRKKNTTSVPTLPQSKINQSLLVPPPQIMSPAQSYSTYIPPEPKFDPNDYIT-
Ptcen_icl10b   1 ------------------------------------MNRKKNTTSVPTLPQSKVNPQYLAPPPQQLSPAQSYSTFIPPEPKFDPNDYIT-
Ptcen_icl11a   1 MKNQRKSQSPFRTTQSIMRDSPNTQLDESSISTNRIPQNRESTRARMKINQSHNNALAQGGQIRKQIAAERASANGGNPNEFNPKKFVT-
Ptcen_icl11b   1 MRNQRKSQSPFRTNQSVMRDSPNTQLDESSISTNRVPQNRESTRARMKINQSHNNALAQGGQIRKQIAAERTSAKGGNPNEFNPKKFVT-
Ptcen_icl11c   1 MRNQITSHSPFRTTQSIIRDSPHTQLDESRISNNRVPQNRESMRARMLINQSHNNIQNQGQQVRKQIAAERTQSKGGNPNEFNPKKFIT-
Ptcen_icl9b    1 --------------------------MSRTQSRQQSAAQPTQQAQKN-QPPAPLPAPTKGKAPAPVQQPVQQQPAGFDASKYVK-
Ptcen_icl9a    1 --------------------------MNRNQSRQQSAAQPTQQASKT-QPPPPAQAPAKGKGPAPAQQAVQQQPGGFDASKYVK-
Ptcen_icl9c    1 --------------------------MSRSQQKQQSAAQPTQQANKSQVQQAPAATKGKGPAPVVSQQ---PAASGFDPSKYVK-
Ptcen_icl9d    1 --------------------------MSRSQQKQQQQAAQTTQQANKS-QVQQAPAATRGKSPATAASQQPVQPAASGFDPSKYVK-
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Ptcen_icl1a   31 EGLTEAEVLEIKEAFDLFDTDGTQSIDPKELKAAVTSLGFEAKNQTIYQMISDLDTDGS-GQIDFAEFLKLVTARISERDSKADIQKVFN
Ptcen_icl1d   31 EGLTEAEVLEIKEAFDLFDTDGTQSIDPKELKAAVTSLGFEAKNQTIYQMISDLDTDGS-GQIDFAEFLKLVTARISERDSKADIQKVFN
Ptcen_icl1b   31 EGLTEAEVLEIKEAFDLFDTDGTQSIDPKELKAAVTSLGFEAKNQTIYQMISDLDTDGS-GQIDFAEFLKLVTARISERDSKADIQKVFN
Ptcen_icl1c   31 EGLTEAEVLEIKEAFDLFDTDGTQSIDPKELKAAVTSLGFEAKNQTIYQMISDLDTDGS-GQIDFAEFLKLVTARISERDSKADIQKVFN
Ptcen_icl1f   31 EGLTEAEVLEIKEAFDLFDTDGTQSIDPKELKAAVTSLGFEAKNQTIYQMISDLDTDGS-GQIDFAEFLKLVTARISERDSKADIQKVFN
Ptcen8        29 EGLTEAEIDEIREAFNLFDTTGTGRVDPRELKAAQSLGFDQKNPTIFNMAALENEGDRTDIDFQFLDAITSKIGNREHRDGINKIED
Ptcen15       29 EGLTEAEIDEIREAFNLFDTTGTGRVDPRELKAAQSLGFDQKNPTIFNMAALENEGHRTDIDFQFLDAITSKIGNRENRDGINKIED
Ptcen10       27 EGLTEAEIDEIREAFNLFDTTGTGRVDPRELKAAQSLGFDQKNPTIFNMAALENEG--TDIDFQFLDAITSKIGNRESKDGINKIED
Ptcen12       27 EGLTEAEIDEIREAFNLFDTTGTGRVDPRELKAAQSLGFDQKNPTIFNMAALENEG--TDVDFQFLDAITSKIGNRESKDGINKIED
Ptcen_icl1e   27 EGLTEAEIPEIKEAFNLFDTTGTGRVDPRELKAAQSLGFDQKNPTIFNMAALENEG--TDIDFQFLDAITSKIGNRESRDGINKIED
Ptcen_icl1g   27 EGLTEAEIPEIKEAFNLFDTTGTGRVDPRELKAAQSLGFDQKNPTIFNMAALENEG--TDIDFQFLDAITSKIGNRESRDGINKIED
Ptcen18       27 EGLTEAEIPEIKEAFNLFDTTGTGKVDPRELKAAQSLGFDQKNPTIFNMAALENEG--NEIDFQFLDAITSKIGNRESRDGINKIED
Ptcen_icl5a   29 NYLTPAEINDLRETFDLFDDDKSGTIDAHEIKKVIEDLGVDARNKFIYQMAQLDENFG--CSIDFTEVNIISDRIGNNKTKEGAFKLFQ
Ptcen_icl5b   29 NYLTPAEINDLRETFDLFDDDKSGTIDAHEIKKVIEDLGVDARNKFIYQMAQLDENFG--CSIDFTEVNIISDRIGNNKTKDGAFKLFQ
Ptcen_icl6a   31 NYLTPAEINDLRETFDLFDDDKSGTIDAHEIKKVIEDLGVDARNKFIYQMAQLDENHG--ESINFTEVDIISNRIGNNKTREGAQKLFQ
Ptcen_icl6b   31 NYLTPAEINDLRETFDLFDDDKSGTIDAHEIKKVIEDLGVDARNKFIYQMAQLDENHG--ESINFTEVDIISNRIGNNKTREGAQKLFQ
Ptcen_icl7a   22 TTLTNAHIETYRLENLACNPRARRIDLKDVMITAQQLGLVEKSPIANTSQISDQHGDCGVDFEEVRELTTKIGNTFDQKGREQLFT
Ptcen_icl7b   22 TTLTNAHIETYRLENLACDPRARRIDLKDVMITAQHLGLVEKSPIANTSQISDQHGDCGVDFEEVRELTTKIGNTFEQKGREQLFT
Ptcen_icl8a   23 EIFTYTHIAEFYDMSILYAEPRAKKADVRDILVTAKLLGLTDKFPIAHADPTASSYDD-AVDFTEVSDLTAKIGNPFDQKGRVQLFK
Ptcen_icl8b   23 EIFTYTHIAEFYDMSVILYAEPRAKKADVRDILVTAKLLGLTDKFPIAHADPTASSYDD-AVDFTEVSDLTAKIGHPFDQKGRVQLFK
Ptcen_icl3a   38 EHLTKAEVLEVKQAFDLFDNDGSGAIDFQELREAFEASCIKTYHNKFIYQMLGELDTDNSCGGIDFEEFLHLAHAKVSDKDTREQIQKVFN
Ptcen_icl3d   39 EHLTKAEVLEVKQAFDLFDNDGSGAIDFQELREAFEASCIKTYHNKFIYQVLGELDTDNSCGGIDFEEFLHLAHAKVSDKDTREQIQKVFN
Ptcen_icl3e   37 EHLTKAEVLEVKQAFDLFDNDGSGAIDFQELREAFEASCIKTYHNKFIYQVLGELDTDNSCGGIDFEEFLHLAHAKVSDKDTREQIQKVFN
Ptcen_icl3f   44 EHLTKAEVLEVKQAFDLFDGDGSGAIDFQELREAFEASCIKTYHNKFIYQVLGELDTDNSCGGIDFEEFLHLAHAKVSDKDTREQIQKVFN
Ptcen_icl3b   42 QNLSRAEVIELKKAFDLFDDGSGAIDFAELLKGAFEDLGLRAQN-KIIYQVLGEIDQDNQCGFSEINFKIAHAAKQNLKETRGSMMTFN
Ptcen_icl3g   41 QNLSRAEVIELKKAFDLFDDGSGAIDFAELKGAFEELGLRAQN-KIIYQVLGEIDQDNQCGFSEINFKIAHAAKQNLKETRGSMMTFN
Ptcen_icl10a  51 GSTTKRDILYKEIPDFLDSNNNCVIQEMDILKKAFASACKYQPKKQIIYQIIADFDQDQSCIIEFREEVRMMSMHPGEKDTDPDFENIEY
Ptcen_icl10b  51 GSTTKRDILYKEIPDFLDSNNNCVIQEMDLLKKAFASACKYQPKKQIIYQIIADFDQDQSCIIFFREEVRMMSMNPGEKDTDPDFENIEY
Ptcen_icl11a  87 KDLKESDIIDIKQVFDYVDSEQACIISFNDIEQLTSCG-YHPTKETLYEIFSELDEDELCGTIFSYFIGILNQDKSKSERKDTIRRVYR
Ptcen_icl11b  87 KDLKESDIIDIKQVFDYVDSEQACIISFNDIEQLTSFG-YHPTKETLYEIFSELDEDELCGTIFSYFIOILNQDKSKSERKDTIRRVYR
Ptcen_icl11c  87 KELKESDIIDIKQVFDYVDSEQACIISFNDIEQLIISFG-YHPSKETLYEIFSELDEEELCGTIFSQYFIAILNQDKTKSEKKDVIRRVYR
Ptcen_icl9b   56 EGLSKAEVLKIKECFDLFDDDKSGTISEMKNAIIALGCMEQSAEEIVNYIQDLDQDGSSLIDFEEFINIFGFSGTIED-EQVLEKLYQE
Ptcen_icl9a   56 EGLSKAEVLKIKECFDLFDDDKSGTISEMKNAIIALGCMEQSAEEIVNYIQDLDQDGSSLIDFEEFINIFGFSGTIED-EQVLEKLYQE
Ptcen_icl9c   53 EGLSKAEVQKIKECFDLFDDDKSGTISEMKNAIIALGCMEQSAEEIVNYIQDLDQDGSSLIDFEEFINIFGFSGTIED-EQVIEKLYQE
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Ptcen_icl1a    121  LFDSERACVTLKDLRKVAK-ELGETMDDSELQEMIDRAD----SDGDAQVTFEDFYNIMTKKTEA-----------
Ptcen_icl1d    121  LFDSERACVITLKDLRKVAK-ELGETMDDSELQEMIDRAD----SDGDAQVTFEDFYNIMTKKTEA-----------
Ptcen_icl1b    122  LFDSERACVITLKDLRKVAK-ELGETMDDSELQEMIDRAD----SDGDAQVTFEDFYNIMTKKTEA-----------
Ptcen_icl1c    123  LFDSERACVITLKDLRKVAK-ELGETMDDSELQEMIDRAD----SDGDAQVTFEDFYNIMTKKTEA-----------
Ptcen_icl1f    123  LFDSERACFITLKDLRKVAK-ELGETMDDSELQEMIDRAD----SDGDTQVTFEDFYNIMTKKTEA-----------
Ptcen8         120  LFDDDGSNTINLNNLKRVSK-ELGETMTAEELAEMIERAA----SNG-REISREDFYNIVKRTFM-----------
Ptcen15        120  LFDDDGSNSINLNNLKRVSK-ELGETMTAEELAEMIERAA----SNG-REITREDFYNIVKRTFM-----------
Ptcen10        116  LFDDDGSNSINLNNLKRVSK-ELGETMTAEELAEMIERAA----SNG-REITREDFYNIVKRAFM-----------
Ptcen12        116  LFDDDGSNSINLNNLKRVSK-ELGETMTAEELAEMIERAA----SNG-REITREDFYNIVKRAFM-----------
Ptcen_icl1e    116  LFDDDGSNSINLNNLKRVSK-ELGETMTAEELAEMIERAA----SNG-RDISREDFYNIVKRTFM-----------
Ptcen_icl1g    116  LFDDDGSNSINLNNLKRVSK-ELGETMTAEELAEMIERAA----SNG-RDISREDFYNIVKRTFM-----------
Ptcen18        116  LFDDDGSNAINLNNLKRVSK-ELGETMTAEELAEMIERAA----SNG-REISREDFYNIVKRTFM-----------
Ptcen_icl5a    118  IYDPEDTGFIDFTNLKRVAK-ELGETNDDELHEMIHEIHILRKTSPEQISFDEFYEITTAPRRY-----------
Ptcen_icl5b    118  IYDPEDTGFIDFTNLKRVAK-ELGETNDDELHEMIHEIHILRKTSPEQISFDEFYEITTAPRRY-----------
Ptcen_icl6a    120  IYDPEDTGLIDFTNLKRVAK-ELGETNDDELHEMIHEIHILRKTSPEQISFEEFYEITTAPRRY-----------
Ptcen_icl6b    120  IYDPEDTGFIDFTNLKRVAK-ELGETNDDELHEMIHEIHILRKTSPEQISFEEFYEITTAPRRY-----------
Ptcen_icl7a    113  TVDIDGKGTIDKEDLRKISD-ELHLNFSQKDIDEVIHNVAG----YDAEDITAEQEEKYAKLTNRRKIETEVLRTKF
Ptcen_icl7b    113  TVDIDGKGTIDKDDLRKISD-ELHLNFSQKDIDEIIHNVAG----YDAVDITAEQEEKYAKLTNRRKIETEVLRTKF
Ptcen_icl1a    113  LIDVDGKCTIDKGDLHKISE-ELRFNITEDDIEEIIHNVAG----YEAEDVTEEKIEEKYGKRVQRRQVEQEIYRNKF
Ptcen_icl18b   113  LIDVDGKCTIDKGDLHKISE-ELRFNITEDDIEEIIHNVAG----YEAEDVSEEKIEEKYGKRVQRRQVEQEIYRNKF
Ptcen_icl3a    129  LXDWNKEGRITWDDLKRVAQ-DLGEEMTDEEIQHMFKKADL----DDDGFVTFDDFYNLMTQKEYGKQ---------
Ptcen_icl3d    130  LXDWNKEGRITWDDLKRVAQ-DLGEEMTDEEIQHMFKKADL----DDDGFVTFDDFYNLMTQKEYGKQ---------
Ptcen_icl3e    128  LXDWNKEGRVTWDDLKRVAQ-DLGEEMTDEEIQHMFKKADL----DDDGFVTFDDFYNLMTQKEYGKQ---------
Ptcen_icl3f    135  LXDWNKEGRITWDDLKRVAQ-DLGEEMTDEEIQHMFKKADL----DDDGFVTFDDFYNLMTQKEYGKQ---------
Ptcen_icl3b    132  LFDLNREGRITWDDLKRVSV-DLGDEINDEEVKKIFRKADL----DDDGFVTFDDFYNMMTGRVYYD----------
Ptcen_icl3g    131  LFDLNREGRITWDDLKRVSV-DLGDDINDEEVKKIFRKADL----DDDGFVTFDDFYNMMTGRVYYD----------
Ptcen_icl10a   144  QFDLDYKGYILIDDLREMAS-ECNENPKDETLENIIKACDP----GNETIRKQGEIRYMKSLQKKN----------
Ptcen_icl10b   144  QFDIDYKGYISIDDLREMAS-ECNENPKDEILQNIIQSCDP----GNETIRKQAEIRYMKSAQKKR----------
Ptcen_icl11a   179  KYDKNNKCFITLQDLRQVVYKDLKEETDEVLAEIFKKTDS----NQDCKITFEDFYNVMTKKVYY-----------
Ptcen_icl11b   179  KYDKNNKCFYTLQDLRQVVYKDLKEETDEVLAEIFKETDS----NQDCKITFEDFYNVMTKKVYY-----------
Ptcen_icl11c   179  KYDKSNKGYITLQDLRQVVYKDLKEDIDEVLAEIFRKTDS----NQDCKITFEDFYNVITTKKVYY-----------
Ptcen_icl9b    146  EFDSSGQSKITYEDFKRIND-LVSERYTDQEIREMVEYADK----DKDCSLSWDEEKTVVQKEYQNQA---------
Ptcen_icl9a    146  EFDSSGQGKIAYEDFKRIND-LVSERYTDQEIREMVEYADK----DKDCSLSWDEEKAVVQKEYPNQA
Ptcen_icl9c    144  EFDSSGQSKIIYEDFKRIND-LVSERYTDQEIREMVEYADK----DKDCSLSWDEEKAVVQKEYPNQA---------
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