```
                                 ((((((((((((.(((((((.....)))))).)))))).)))))...(.(.(((.(((....
chr-3.trna27-Val-CAC             GUUUGGGUGGUGUAGUUGGUUAUCAUGCUAGUCUCACACACUAGAG-GUCCCCAGUUUGA 59
chr-12.trna131-Val-CAC           GUUUGGGUGGUGUAGUUGGUUAUCAUGUUAGUCUCACACACUAGAG-GUCCCCAGUUUAA 59
chr-10.trna146-Val-CAC           GUUUGGGUGGUGUAGUUGGUUAUCACGUUAGUCUCACACACUAGUG-GUCCCCGGUUUGA 59
chr-12.trna156-Val-CAC           GUCUGGGUGGUGUAGUUGGUUAUCACGUUAGUCUCACACACUAGAG-GUCCUUGGUUUCA 59
chr-5.trna240-Val-CAC            GUCUGGGUGGUGUAGUUGAUUAUCAUGCUAGUCUCACACACUAGAG-GUCCCUAGUUCGG 59
chr-12.trna132-Val-CAC           GUCUGGGUGGUGUACUUGGUUAUCAUGCUAGUCUCACACACUAGAG-GUCCCCGGUUCAA 59
chr-3.trna5-Val-CAC              GUCUGGGUGGUGUAGUUGGUUAUCACACUAGUCUCACACACUAGAG-GUCCCCGGUUCAA 59
chr-3.trna4-Val-CAC              GUCUGGGUGGUGUAGUUGGUUAUCACACUAGUCUCACACACUAGAG-GUCCCCGGUUCAA 59
chr-12.trna155-Val-CAC           GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAGAG-GUCCCUGGUUCAA 59
chr-12.trna133-Val-CAC           GUCUGGGUGGUGUAGUUGGUUAUCACAUUAGUCUCACACACUAGAG-GUCCCUGGUUCAA 59
chr-12.trna158-Val-CAC           GUCUGGGUGGUGUAGCUGGUUAUCACGCUAGUCUCACAUAUUAGAG-GUCCCUGGUUCAA 59
chr-12.trna160-Val-CAC           GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUUUCACACACUAGAG-GUCCCCGGUUCAA 59
chr-3.trna26-Val-CAC             GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAGAG-GUCUCCGGUUCGA 59
chr-3.trna143-Val-CAC            GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAGAG-GUCCCCGGUUCGA 59
chr-4.trna93-Val-CAC             GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAGAG-GUCCCCGGUUCGA 59
chr-6.trna61-Val-CAC             GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAGAG-GUCCCCGGUUCGA 59
chr-6.trna62-Val-CAC             GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAGAG-GUCCCCGGUUCGA 59
chr-9.trna71-Val-CAC             GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAGAG-GUCCCCGGUUCGA 59
chr-10.trna143-Val-CAC           GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAGAG-GUCCCCGGUUCGA 59
chr-10.trna147-Val-CAC           GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAGAG-GUCCCCGGUUCGA 59
chr-14.trna18-Val-CAC            GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAGAG-GUCCCCGGUUCGA 59
chr-14.trna19-Val-CAC            GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAGAG-GUCCCCGGUUCGA 59
chr-15.trna9-Val-CAC             GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAGAG-GUCCCCGGUUCGA 59
chr-15.trna10-Val-CAC            GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAGAG-GUCCCCGGUUCGA 59
chr-15.trna66-Val-CAC            GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAGAG-GUCCCCGGUUCGA 59
chr-8.trna149-Val-CAC            GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAGAG-GUCCCCAGUUCGA 59
chr-12.trna3-Val-CAC             GUCUGGGUGGUGUAGUUGGUUAUCAUGCUAGUCUCACACACUAGAG-GUCCCCGGUUCGA 59
chr-12.trna157-Val-CAC           GUUUGGGUGGUGUAGUUGGUUAUCAUGCUAGUCUCACACACUAGAG-GUCCCCGGUUCAA 59
chr-6.trna25-Val-CAC             GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAGAG-GUCCCUGGUUCGA 59
chr-2.trna131-Val-CAC            GUUUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACAAGAG-GUCCCCGGUUCGA 59
chr-12.trna159-Val-CAC           GUCUGGGUGGUGUAGUUGGUUAUCACACUAGUCUCACAUACUAGAG-GUCCCUGGUUCAA 59
chr-9.trna72-Val-CAC             GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACAGUAGAG-GUCCCUAGUUCGA 59
chr-10.trna144-Val-CAC           GUCUGGGUGGUGUAGUUGGUUAUCAUGCUAGUCUCACACACUAGAG-GUCUCCAGUUCAA 59
chr-12.trna135-Val-CAC           GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAAAG-GUCCCUUGUUCAA 59
chr-10.trna145-Val-CAC           GUUUGGGUGGUGUAGUUGGUUAUCAAGCUAGUCUCACACUCUAGAG-GUCCCUAGUUCAA 59
chr-15.trna19-Val-CAC            GUCUGGGUGGUGUAGUUGGUUAUCACGCUUGUCUCACACACUAGAG-GUCCCUGGUUCAA 59
chr-6.trna132-Val-CAC            GUCUGGGUGGUGUAGUUGGUUAUCAUGCUAGUCUCACACACUAGAG-GUUCUCGGUUCGA 59
chr-12.trna136-Val-CAC           GUCUGGGUGGUGUAGUUGGUUAUCACGCUAAUCUCACACACUAGAG-GUCCCCGGUUCAA 59
chr-12.trna134-Val-CAC           GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAAAG-GUCCCCGGGUCAA 59
chr-12.trna137-Val-CAC           GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAAAG-GUCCCCGGGUCAA 59
chr-12.trna138-Val-CAC           GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAAAG-GUCCCCGGGUCAA 59
chr-12.trna139-Val-CAC           GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAAAG-GUCCCCGGGUCAA 59
chr-12.trna140-Val-CAC           GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAAAG-GUCCCCGGGUCAA 59
chr-12.trna141-Val-CAC           GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAAAG-GUCCCCGGGUCAA 59
chr-12.trna142-Val-CAC           GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAAAG-GUCCCCGGGUCAA 59
chr-12.trna143-Val-CAC           GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAAAG-GUCCCCGGGUCAA 59
chr-12.trna144-Val-CAC           GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAAAG-GUCCCCGGGUCAA 59
chr-12.trna145-Val-CAC           GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAAAG-GUCCCCGGGUCAA 59
chr-12.trna146-Val-CAC           GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAAAG-GUCCCCGGGUCAA 59
chr-12.trna147-Val-CAC           GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAAAG-GUCCCCGGGUCAA 59
chr-12.trna148-Val-CAC           GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAAAG-GUCCCCGGGUCAA 59
chr-12.trna149-Val-CAC           GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAAAG-GUCCCCGGGUCAA 59
chr-12.trna150-Val-CAC           GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAAAG-GUCCCCGGGUCAA 59
chr-12.trna151-Val-CAC           GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAAAG-GUCCCCGGGUCAA 59
chr-12.trna152-Val-CAC           GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAAAG-GUCCCCGGGUCAA 59
chr-12.trna154-Val-CAC           GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAAAG-GUCCCCGGGUCAA 59
chr-12.trna153-Val-CAC           GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAAAG-GUCCCCGGGUCAA 59
chr-7.trna67-Val-CAC             GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAGUG-GUCCCCGGUUCAA 59
chr-15.trna13-Val-CAC            GUUUGGGUGGUGUAGUUGGUUAUCACUCUAGUCUCACACACUAGAG-GUCCCCGGUUCAA 59
chr-10.trna148-Val-CAC           GUCUGGGUGGUGUAGUGGGUUAUCACGCUAGUCUCACACACUAGAGCCUCCCCUGGUUCGA 60
chr-9.trna141-Val-CAC            AUUGUUGUGGUGUAGU-GGUUAUCACGUUAGUUUCACAAACUAAAG--UUCCCAGUUCAA 57
chr-9.trna148-Val-CAC            AUUGAUGUGGUGUAGU-GGUUAUCACGUUAGUUUCACAAACUAAAG--UUCCCAGUUUAA 57
                                 .........10........20........30........40........50.........
```

```
                                 ))).)))))))))).
chr-3.trna27-Val-CAC             ACUUGUGCUCAGACA 74
chr-12.trna131-Val-CAC           AUUUGGGCUCAAACA 74
chr-10.trna146-Val-CAC           ACUCGGGCUCAAACA 74
chr-12.trna156-Val-CAC           ACCUGGGCUCAGACA 74
chr-5.trna240-Val-CAC            AUCCGGGCUUAGACA 74
chr-12.trna132-Val-CAC           ACCCGGGCUCAGACA 74
chr-3.trna5-Val-CAC              ACCCGGGCUUAGACA 74
chr-3.trna4-Val-CAC              ACCCGGGCUUAGACA 74
chr-12.trna155-Val-CAC           ACUCGGGUUCAGACA 74
chr-12.trna133-Val-CAC           ACCCGGGCUUAGACA 74
chr-12.trna158-Val-CAC           ACCCGGGCUCAGACA 74
chr-12.trna160-Val-CAC           ACCCGGGCUCAGACA 74
chr-3.trna26-Val-CAC             ACCCGGGCUCAGACA 74
chr-3.trna143-Val-CAC            ACCCGGGCUCAGACA 74
chr-4.trna93-Val-CAC             ACCCGGGCUCAGACA 74
chr-6.trna61-Val-CAC             ACCCGGGCUCAGACA 74
chr-6.trna62-Val-CAC             ACCCGGGCUCAGACA 74
chr-9.trna71-Val-CAC             ACCCGGGCUCAGACA 74
chr-10.trna143-Val-CAC           ACCCGGGCUCAGACA 74
chr-10.trna147-Val-CAC           ACCCGGGCUCAGACA 74
chr-14.trna18-Val-CAC            ACCCGGGCUCAGACA 74
chr-14.trna19-Val-CAC            ACCCGGGCUCAGACA 74
chr-15.trna9-Val-CAC             ACCCGGGCUCAGACA 74
chr-15.trna10-Val-CAC            ACCCGGGCUCAGACA 74
chr-15.trna66-Val-CAC            ACCCGGGCUCAGACA 74
chr-8.trna149-Val-CAC            ACCUGGGCUCAGACA 74
chr-12.trna3-Val-CAC             ACCCGGGCUCAGACA 74
chr-12.trna157-Val-CAC           ACUCGGGCUCAAACA 74
chr-6.trna25-Val-CAC             ACUCGGGCUCAGACA 74
chr-2.trna131-Val-CAC            ACCCGGGCUCAGACA 74
chr-12.trna159-Val-CAC           ACCCGGGCUCAGACA 74
chr-9.trna72-Val-CAC             ACCUGGGCUCAGACA 74
chr-10.trna144-Val-CAC           ACUUAGGCUUAGACA 74
chr-12.trna135-Val-CAC           ACCCGAGCUCAGACA 74
chr-10.trna145-Val-CAC           ACUUGGGCUCAAACA 74
chr-15.trna19-Val-CAC            ACCUGGGCUCAGACA 74
chr-6.trna132-Val-CAC            ACCUGGGCUCAGACA 74
chr-12.trna136-Val-CAC           ACUCGGGCUCUAACA 74
chr-12.trna134-Val-CAC           ACUCGGGCUCAAACA 74
chr-12.trna137-Val-CAC           ACUCGGGCUCAAACA 74
chr-12.trna138-Val-CAC           ACUCGGGCUCAAACA 74
chr-12.trna139-Val-CAC           ACUCGGGCUCAAACA 74
chr-12.trna140-Val-CAC           ACUCGGGCUCAAACA 74
chr-12.trna141-Val-CAC           ACUCGGGCUCAAACA 74
chr-12.trna142-Val-CAC           ACUCGGGCUCAAACA 74
chr-12.trna143-Val-CAC           ACUCGGGCUCAAACA 74
chr-12.trna144-Val-CAC           ACUCGGGCUCAAACA 74
chr-12.trna145-Val-CAC           ACUCGGGCUCAAACA 74
chr-12.trna146-Val-CAC           ACUCGGGCUCAAACA 74
chr-12.trna147-Val-CAC           ACUCGGGCUCAAACA 74
chr-12.trna148-Val-CAC           ACUCGGGCUCAAACA 74
chr-12.trna149-Val-CAC           ACUCGGGCUCAAACA 74
chr-12.trna150-Val-CAC           ACUCGGGCUCAAACA 74
chr-12.trna151-Val-CAC           ACUCGGGCUCAAACA 74
chr-12.trna152-Val-CAC           ACUCGGGCUCAAACA 74
chr-12.trna154-Val-CAC           ACUCGGGCUCAAACA 74
chr-12.trna153-Val-CAC           ACUCGGGCUCAAACA 74
chr-7.trna67-Val-CAC             ACCCGGGCUCAGACA 74
chr-15.trna13-Val-CAC            ACCCGGGCUCAGGUA 74
chr-10.trna148-Val-CAC           ACCCGGGCUCGGACA 75
chr-9.trna141-Val-CAC            UCCUGAGCAUCAACA 72
chr-9.trna148-Val-CAC            UCCUGAGCAUCAACA 72
                                 .........70....
```