

**A Hirudinea ground pattern**

Erpobdellidae (four species); Salifidae (two species); Glossiphoniidae (nine species); Piscicolidae (five species); Ozobranchidae (*Ozobranchus jantseanus*); Acanthobdellida (two

species)  
cox1 N cox2 D atp8 Y G cox3 Q nad6 cytb W atp6 R H nad5 F E P T nad4l nad4 C M rrnS V rrnL L1 A S2 L2 nad1 I K nad3 S1 nad2

**B *Theromyzon tessulatum* (Rhynchobdellida: Glossiphoniidae)**

cox1 N cox2 D atp8 Y G cox3 Q nad6 cytb W atp6 H R nad5 F E P T nad4l nad4 C M rrnS V rrnL L1 A S2 L2 nad1 I K nad3 S1 nad2

**C *Placobdella lamothei*, *Placobdella parasitica* (Rhynchobdellida: Glossiphoniidae)**

cox1 N cox2 D D atp8 Y G cox3 Q nad6 cytb W atp6 R H nad5 F E P T nad4l nad4 C M rrnS V rrnL L1 A S2 L2 nad1 I K nad3 S1 nad2

**D Hirudinidae (five species); Haemopidae (three species)**

cox1 N cox2 D atp8 G Y cox3 Q nad6 cytb W atp6 R H nad5 F E P T nad4l nad4 C M rrnS V rrnL L1 S2 A L2 nad1 I K nad3 S1 nad2

**E *Erpobdella octoculata*\_KC688270 (Arhynchobdellida: Erpobdellidae); *Dinobdella ferox* (Arhynchobdellida: Hirudinidae)**

cox1 N cox2 D atp8 G Y cox3 Q nad6 cytb W atp6 R H nad5 F E P T nad4l nad4 C M rrnS V rrnL L1 A S2 L2 nad1 I K nad3 S1 nad2

**F *Haemadipsa crenata* (Arhynchobdellida: Haemadipsidae)**

cox1 N cox2 D atp8 G Y cox3 Q nad6 cytb R W atp6 H nad5 F E P T nad4l nad4 M rrnS V rrnL L1 A S2 L2 nad1 K I nad3 C S1 nad2

**G *Haemadipsa yanyuanensis*, *Haemadipsa tianmushana* (Arhynchobdellida: Haemadipsidae)**

cox1 N cox2 D atp8 G Y cox3 Q nad6 cytb W R atp6 H nad5 F E P T nad4l nad4 M rrnS V rrnL L1 A S2 L2 nad1 K I nad3 C S1 nad2

**Fig. 5** Seven gene order patterns identified among the Hirudinea mitogenomes in this study. All genes are encoded on the same strand. PCGs, tRNAs, and rRNAs are marked by yellow, black, and green, respectively, and the rearrangements of tRNAs are shown in red.