

DNA Extraction from Fresh/Frozen Butterfly Tissue using the Qiagen DNeasy Blood and Tissue Kit

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This protocol is based on the manufacturer's handbook for the DNeasy Blood and Tissue Kit (July 2006) with minor modifications and written in reference to our butterfly study system. Methods are suitable for freshly collected, frozen, or dried specimens. Protocol maintained by Zachary Nolen.

Procedure

Day 1 - Tissue Lysis

1. Using a **decontaminated scalpel** and set of tweezers, remove wings, abdomen, legs, and antennae. Store these in a labelled tube or envelope. Transfer **abdomen** and **head** to **Eppendorf LoBind tube**. This step can be done in advance if the tissue is then stored at -80°C .
2. Add **180 μl Buffer ATL** to tube with tissue. **Crush** tissue using pestle by grinding against the sides of the tube. Break tissue down as much as possible.
3. Add **20 μl Proteinase K**, **mix** by vortexing and incubate at **56°C** in agitated water bath **overnight**.

Day 2 - DNA Extraction

1. Add **4 μl RNase A** to sample, **mix** by vortexing, and incubate for **2 min** at **room temperature**.
2. (*Optional*) If sample has particulate matter remaining that may clog the spin column, centrifuge at **5000 x g** for **5 min** and **transfer supernatant** to a **new LoBind tube** and discard the pellet.
3. Mix **200 μl Buffer AL** with **200 μl 96-100% EtOH** in a **separate tube**. Prepare enough to be used with all samples being processed.
4. Add **400 μl** of the **AL/EtOH mixture** to each sample tube and **mix** thoroughly by vortexing.
5. Pipette the mixture from Step 4 into a **DNeasy Mini spin column** in a 2 ml collection tube. Centrifuge at **6000 x g** for **1 min**. Discard flow through and collection tube.
6. Place the spin column in a new 2 ml collection tube, add **500 μl Buffer AW1**, centrifuge at **6000 x g** for **1 min**. Discard flow through and collection tube.
7. Place the spin column in a new 2 ml collection tube, add **200 μl Buffer AW2**, centrifuge at **20 000 x g** for **3 min** to dry the DNeasy membrane. Discard flow-through and collection tube.
 - **Note:** Ensure spin column does not touch flow through on removal from the collection tube. If it does, place in a new spin column and repeat centrifugation to dry.
8. Place the spin column in a clean and **labeled LoBind tube**. Add **65 μl Buffer AE** directly to the column membrane. Incubate at **room temperature** for **1 min**, then centrifuge at **6000 x g** for **1 min** to elute.
9. **Repeat** elution in **Step 8** once more into a **new LoBind tube** so as not dilute the first elution. Label each tube with the elution number, these are your extractions.

Additional notes: According to Qiagen, higher elution volumes (200 µl in handbook) will increase DNA yield, but reduce overall concentration. We use a lower volume to increase concentration.

Required Materials and Reagents

In Kit:

- DNeasy Mini Spin Columns (1 per sample)
- Buffer ATL
- Proteinase K Solution (20 mg/ml)
- Buffer AL
- Buffer AW1
- Buffer AW2
- Buffer AE

User Supplied

- Eppendorf LoBind Tubes (1.5 or 2.0 ml)
- RNase A (100 mg/ml)
- Ethanol (96 - 100%)