

README:

Data Summary

DATA TITLE: Cellular versus whole-animal metabolism and fuel selection data in the western terrestrial garter snake (*Thamnophis elegans*)

PROJECT TITLE: "Temperature dependence of metabolism and fuel selection from cells to whole organisms"

DATA ABSTRACT: These data include information on female western terrestrial garter snakes (*Thamnophis elegans*), born in captivity in fall 2010 from wild-caught pregnant females. Animals were used to study the relationship between whole-animal metabolic rate and cellular rates of oxygen consumption and the primary fuel source used to support metabolism, over a range of environmentally relevant temperatures (24, 28, 32, 36°C).

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COLLECTION INFORMATION:

Time period: Data collected in 2018, uploaded to repository in November of 2020

Location:

FILE DIRECTORY

```
Organsim_Cell_MR
|-> WholeAnimalRespiration_RER_data.csv
|-> CellularOCR_data.csv
|-> d13Cbreath_data.csv
|-> DataCodebook.csv
|-> README.pdf
```

FILE LIST

- `README.pdf` : README file.
- `WholeAnimalRespiration_RER_data.csv` : Comma-separated file containing information on experimental animals, measures of whole-animal respiration, and respiratory gas exchange ratio at each experimental temperature.
- `CellularOCR_data.csv` : Comma-separated file containing information on experimental animals and measures of cellular oxygen consumption rate at each experimental temperature: basal, ATP-linked, maximum, spare capacity
- `d13Cbreath_data.csv` : Comma-separated file containing information on experimental animals and $\delta^{13}\text{C}$ content of breath samples collected at each experimental temperature.
- `DataCodebook.csv` : Codebook containing explanation of variables found in data files.

METHODS AND MATERIALS

DATA COLLECTION METHODS

These data were collected from a laboratory colony of garter snakes (*Thamnophis elegans*).

Measures of whole-animal respiration and cellular oxygen consumption were measured over a

range of environmentally relevant temperatures (24, 28, 32, 36°C) to assess how the temperature dependence of whole-animal and cellular rates of oxygen consumption covary across levels of biological organization. Additionally, two metrics of fuel selection (respiratory exchange ratio and natural abundance of stable carbon isotope composition in breath, $\delta^{13}\text{C}_{\text{breath}}$) were measured to test the temperature-dependence of macronutrient usage as a means of supporting metabolism. All data were collected under Iowa State University IACUC protocol 3-2-5125-J under Dr. Anne Bronikowski.

DATA PROCESSING METHODS

`WholeAnimalRespiration_RER_data.csv` : Measures of oxygen and carbon dioxide were corrected for barometric pressure and the change in instantaneous gas concentrations integrated over the period of time for which respirometry chambers were sealed to calculate VO_2 and VCO_2 (mL/hour) using ExpeData software (sable systems).

`d13Cbreath_data.csv` : samples were analyzed for the naturally occurring stable carbon isotopes (^{12}C and ^{13}C) of C_{O_2} . These are traditionally expressed in δ notation relative to an international standard (Vienna Pee Dee Belemnite) with units of parts per thousand (‰). To calculate the $\delta^{13}\text{C}$ of C_{O_2} from animal breath, we used a two-source mixing model to account for dilution from background C_{O_2} in ambient air.

SOFTWARE

Name: R

Version: Macintosh 4.0.2

URL: <https://www.r-project.org/>

Developer: The R Foundation for Statistical Computing

Name: Expedata

URL: <https://www.sablesys.com/products/classic-line/expedata-p-data-analysis-software/>

Developer: Sable Systems

Licensing

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