**🧬 Project Title:**

**Comparative Analysis of Sex Chromosome Gene Expression in Turtles**

**👩‍💻 Objective:**

To investigate whether **dosage compensation** exists in turtles by comparing gene expression levels of:

* **Z-linked genes**
* **Autosomal genes**  
  between male and female turtles using public RNA-seq data.

**📥 Data Source:**

* Dataset: **GSE183769**
* Source: NCBI GEO
* Samples: Multiple male (TM, CM) and female (TF, CF) RNA-seq FPKM values

**🔬 Methods:**

* Downloaded FPKM values from supplementary file.
* Parsed gene expression data using pandas in Google Colab.
* Identified **Z-linked genes** by scaffold names like NW\_005871025.1 (assumed Z).
* Calculated **average expression** for males and females.
* Plotted **boxplots** for expression comparisons.

**📊 Results Summary:**

| **Category** | **Female Expression** | **Male Expression** | **Observation** |
| --- | --- | --- | --- |
| Z-linked Genes | ~1400 | ~1200 | Female expression slightly higher |
| Autosomal Genes | >2500 | >2000 | Female expression higher |

**🧠 Interpretation:**

* Z-linked expression is not dramatically different between sexes, suggesting **dosage compensation** might be occurring.
* Autosomal gene expression appears similar between sexes, indicating natural balance.

**📄 Conclusion:**

This mini project demonstrates a basic workflow of analyzing sex-linked gene expression using RNA-seq data. The findings tentatively support the presence of dosage compensation in turtles, though further statistical validation is needed.