Using High Throughput Genomic Sequencing to Predict Ecological Impacts on Sea Turtle Populations

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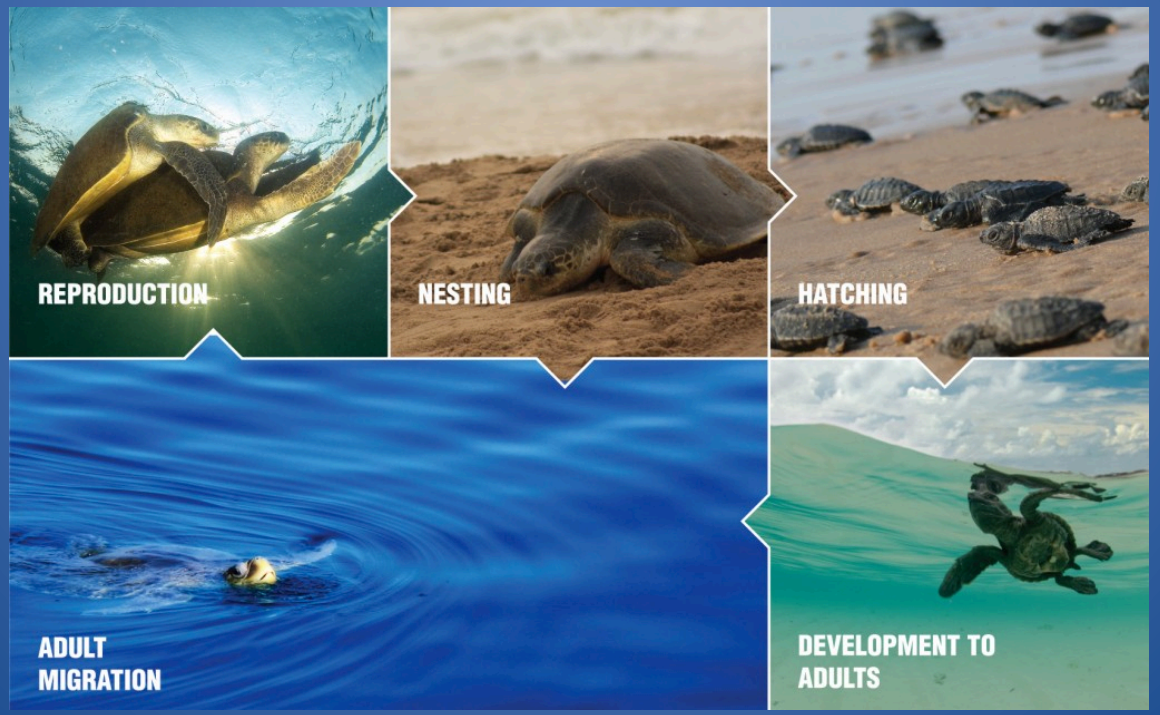
Sea Turtle Life History

- Unique life history makes sea turtles difficult to study



Threats to Sea Turtle Populations

- Threats include:
  - Habitat loss
  - Overexploitation
  - Global warming
  - Disease
- All marine turtles in U.S. waters are protected

Research Goals

1. Impacts of pollution on sea turtle health
2. Identify SNPs to be used as biomarkers
   - Sex
   - Size
   - Migration
   - Foraging

High Throughput Genomic Sequencing

1. Field Sampling
2. RNA Extraction
3. Quality Control
4. Library Sequencing

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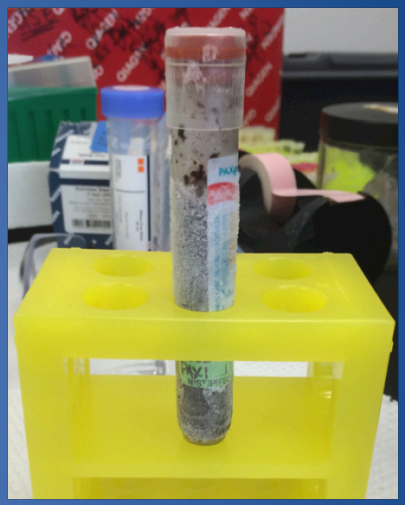
Field Sampling

- Capture turtles in the field
- Paxgene whole blood samples



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High Throughput Genomic Sequencing

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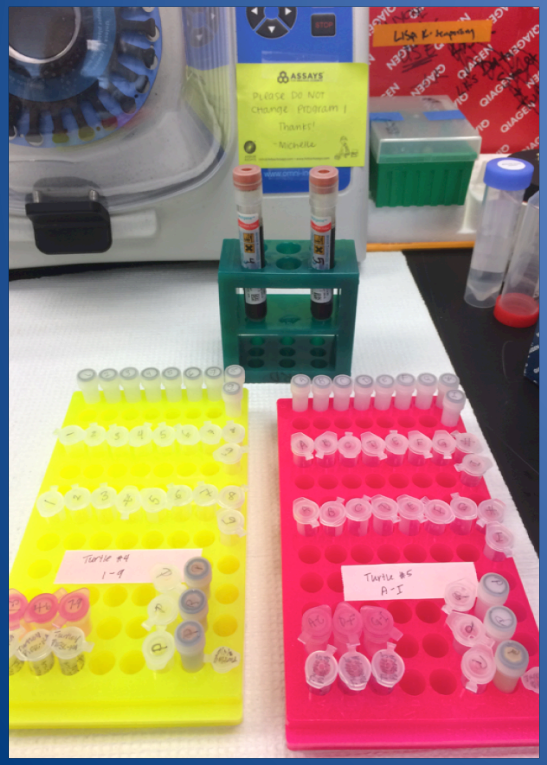
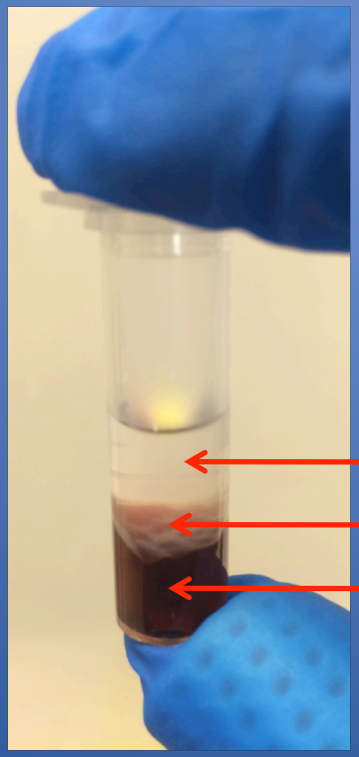
RNA Extraction

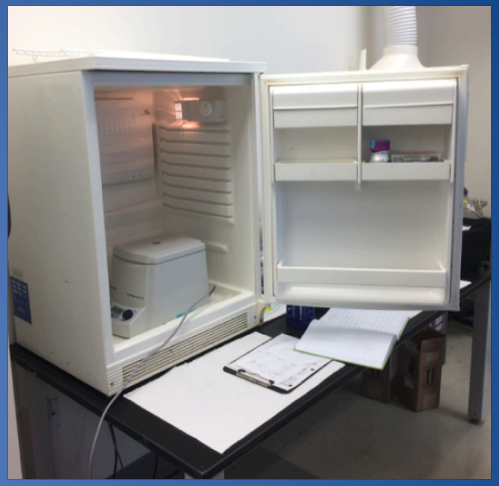
- Optimization of SOP
- Phenol-chloroform extraction method

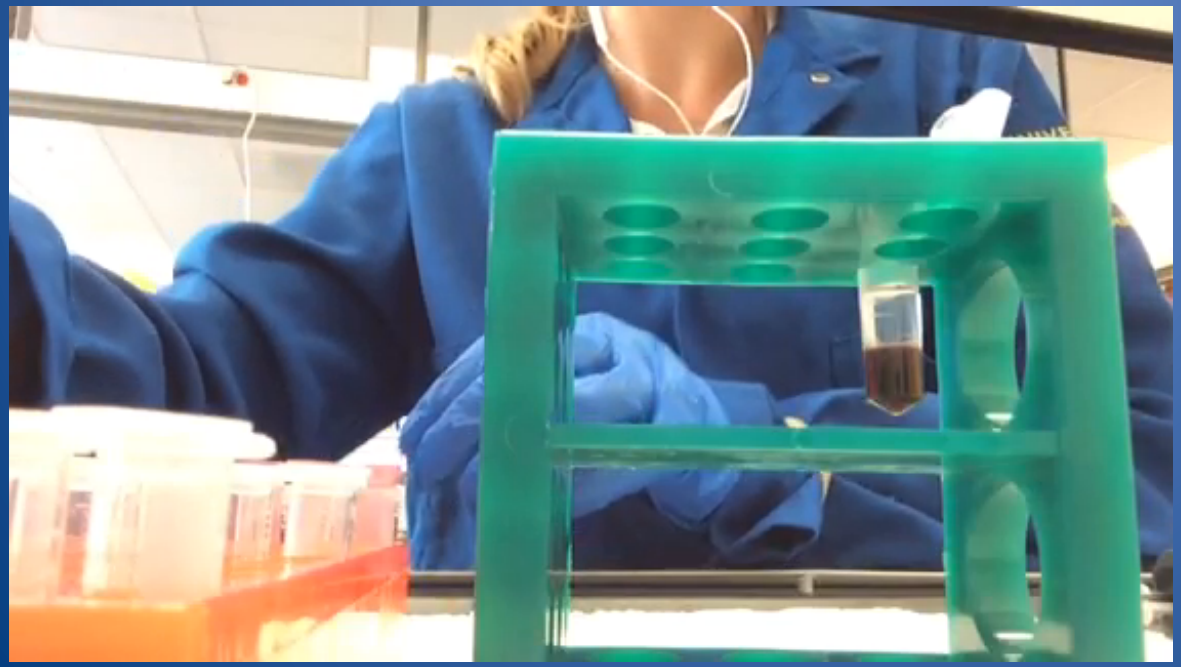


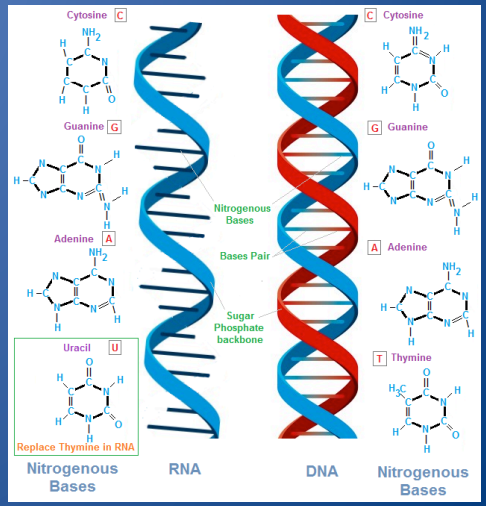


RNA Extraction

- RNA is unstable
  - Temperature sensitive
  - Time sensitive







High Throughput Genomic Sequencing

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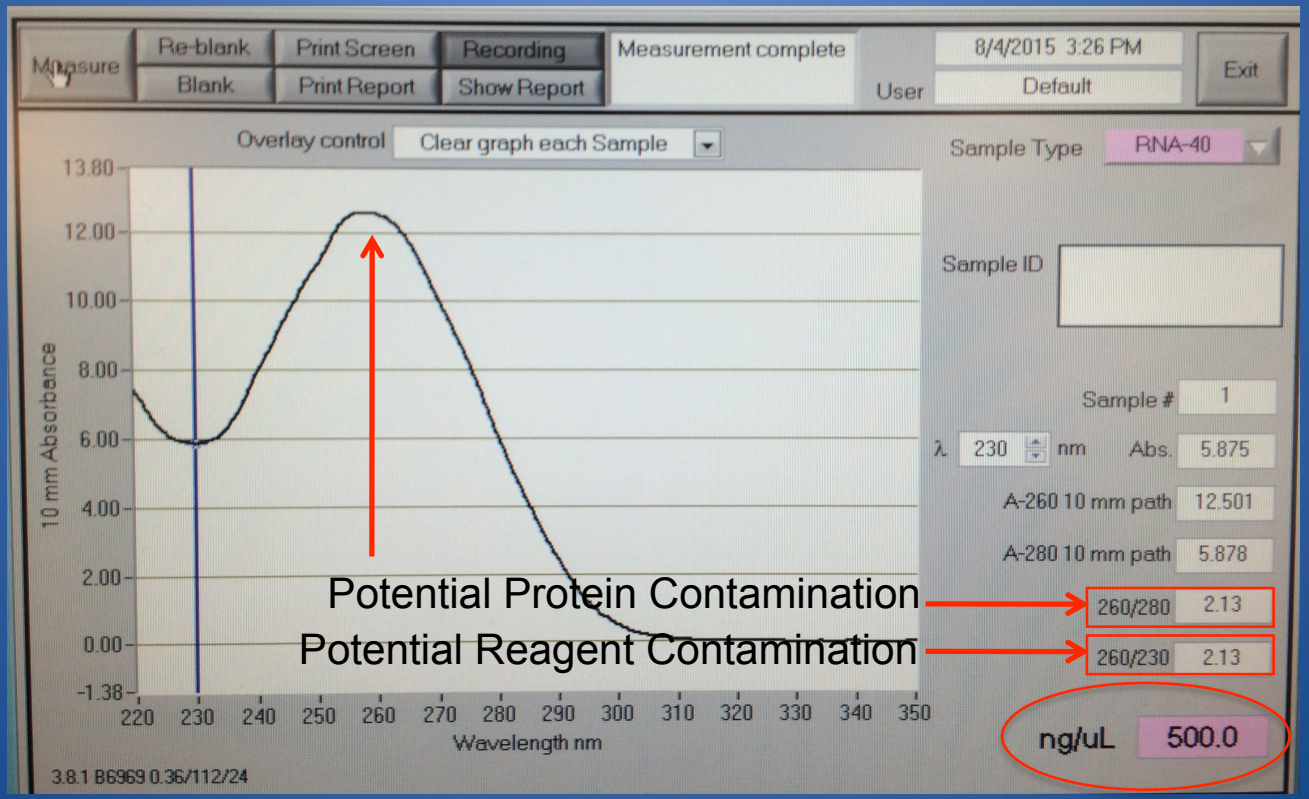
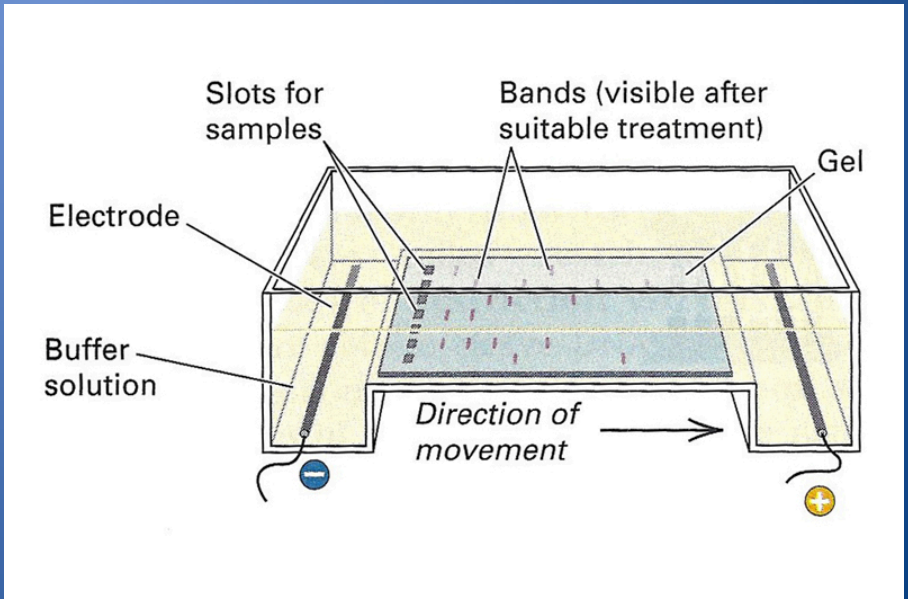
Quality Control

- Nanodrop Spectrophotometry
  - Assessment of nucleic acid purity



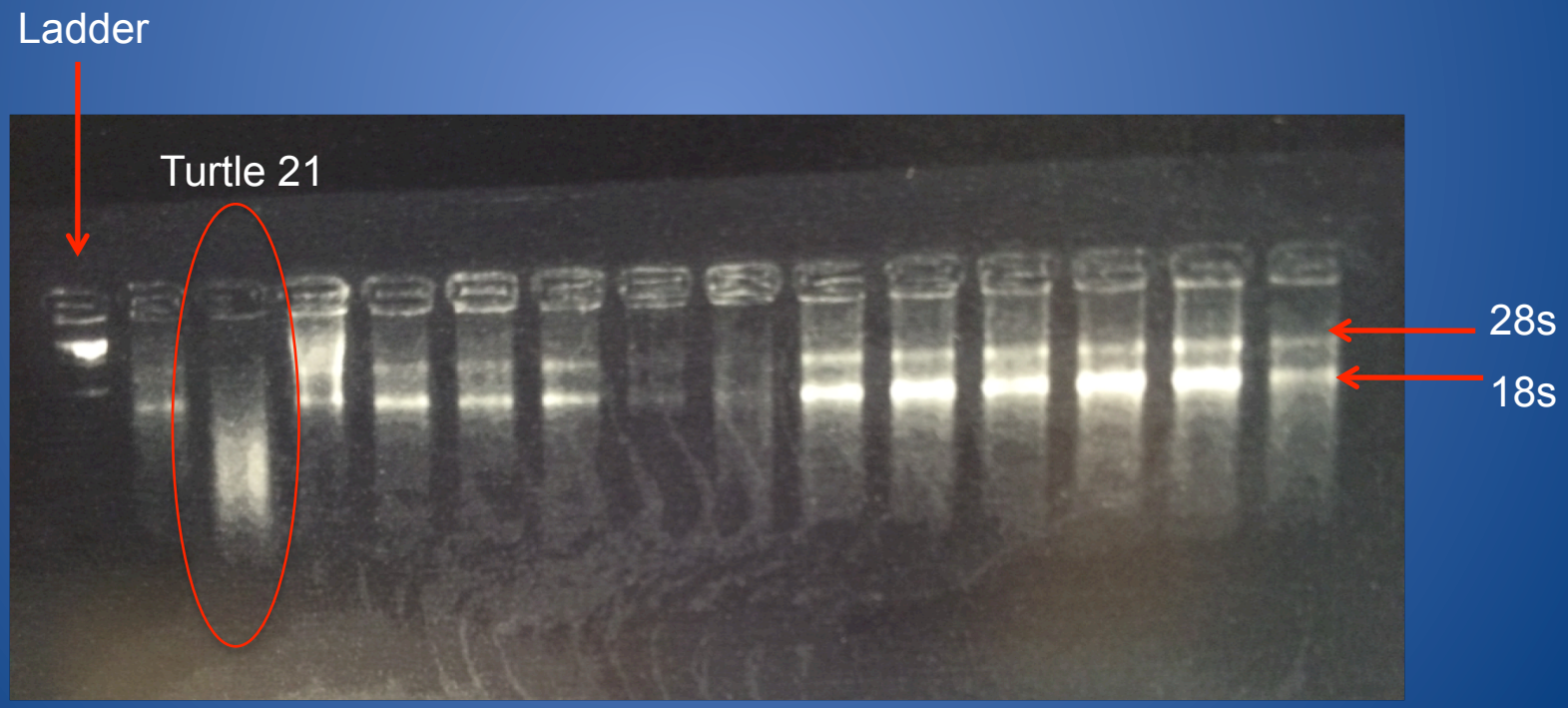
Quality Control

- Gel Electrophoresis
  - Agarose gel
  - Lighter fragments travel further
  - Bands represent concentrations of base pairs



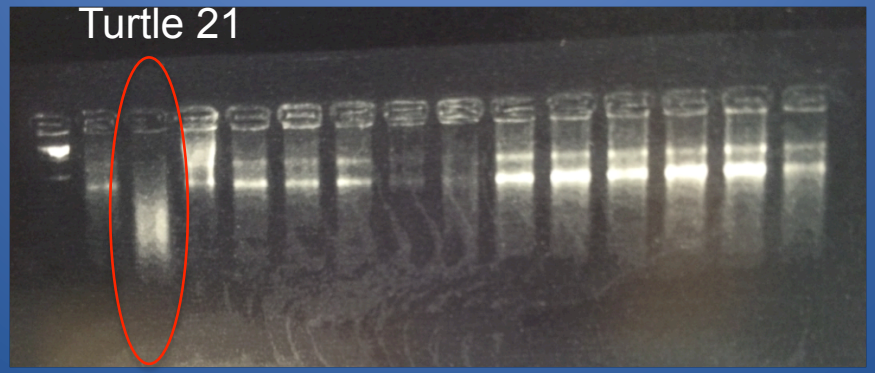
Quality Control

- Gel Electrophoresis
  - Causes of degradation?



Hawaiian Sea Turtle Population

- Spring 2015: 11 turtles captured
  - 3 with known tumors (likely Fibropapillomatosis)
- Gel indicates one turtle with potential RNA degradation
  - Significance of degraded RNA in diseased turtles?



High Throughput Genomic Sequencing

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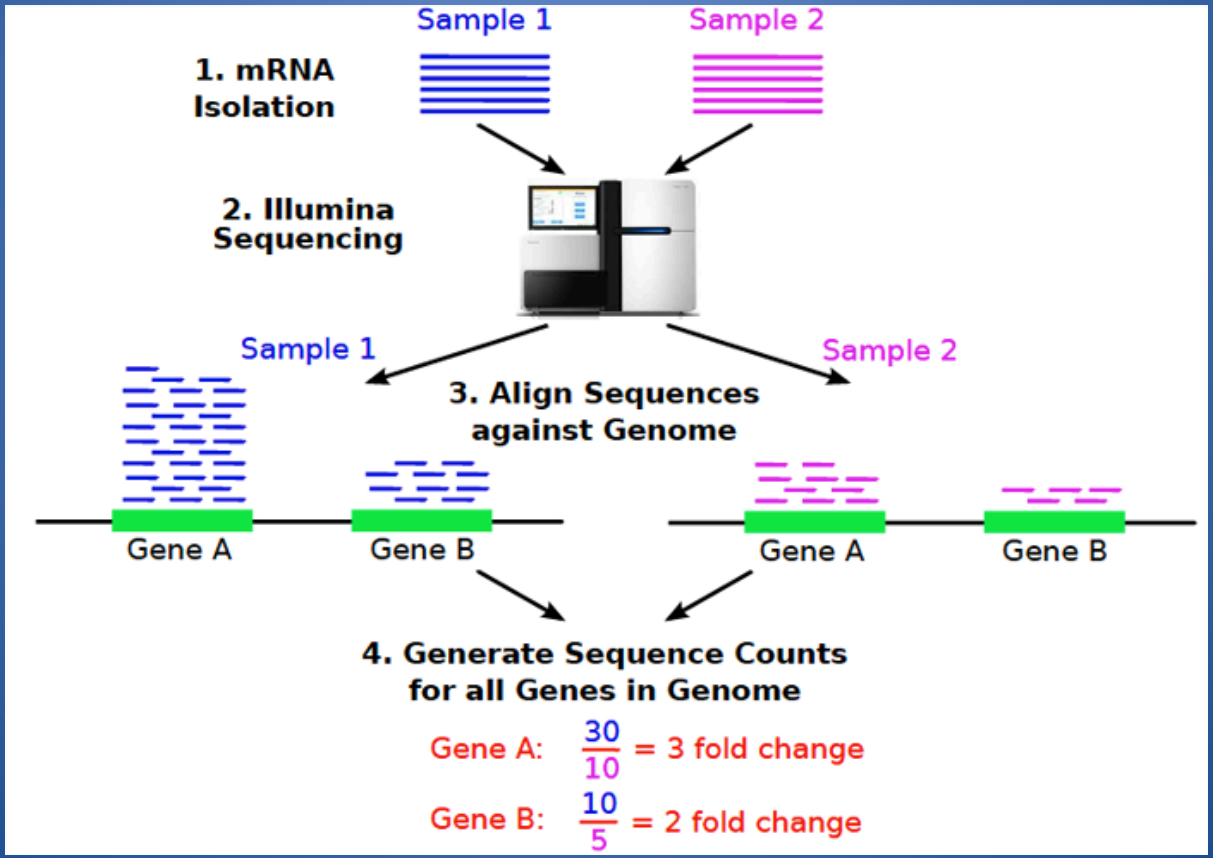
Library Sequencing

- High throughput sequencing



Potential Implications

1. Impacts of pollution on sea turtle health
   - Help conservationists and ecologists predict potential threats to habitat
2. Identify SNPs to be used as biomarkers
   - Provide useful genomic data to other researchers to support their studies

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Questions?