# Olfactory detection thresholds of spider monkeys (*Ateles geoffroyi*) for "green odors"

## Conclusion

- Spider monkeys have a well-developed ability to detect "green odors"
- They are not as sensitive to "green odors" as to previously tested odorant groups
- They are less sensitive to "green odors" than mice and humans
- Behavioral relevance may explain within- and between-species differences in olfactory sensitivity


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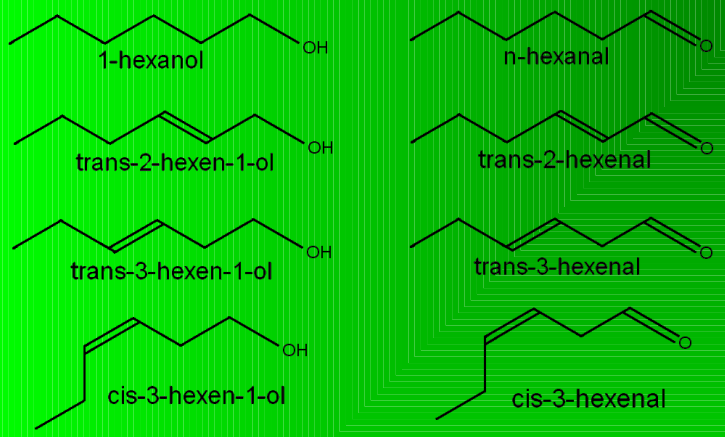
# Background

**Primates and olfaction**

- Recent studies show that olfaction may be more important for primates than previously thought
- Behavioural relevance may determine the olfactory sensitivity of a species to an odorant

**"Green odors"**

- Commonly found in plant material
- Structurally related with eachother
  - Aliphatic alcohols and aldehydes
  - 6-carbon chain length
  - Differ in presence, position and orientation of a double bond




# Aim

The aim was to determine olfactory detection thresholds in spider monkeys for "green odors", and to assess the impact of molecular structural features on olfactory detectability.

# Methods

Two-choice instrumental conditioning paradigm

Monkeys were presented with two paper strips, one impregnated with the odorant and the other with an odorless solution. They had to smell them and choose the paper strip with the odorant. If they chose correctly, they got a food reward. The concentration of the odorant was then decreased in steps, until the monkey could no longer detect it above threshold level (70% correct choices).

*Range of olfactory detection threshold values for each of the different odorants, expressed in parts per million*

| Substance | ppm |
|---|---|
| 1-hexanol | 0.06 – 0.61 |
| trans-2-hexen-1-ol | 0.06 – 0.19 |
| trans-3-hexen-1-ol | 0.02 – 0.20 |
| cis-3-hexen-1-ol | 0.06 – 0.20 |
| n-hexanal | 0.05 – 0.52 |
| trans-2-hexenal | 0.09 – 0.87 |
| trans-3-hexenal | 0.18 – 0.60 |
| cis-3-hexenal | 0.60 |

# Results

- With all odorants, the animals detected concentrations below 1 parts per million, with single individuals performing even better
- The type of functional group affected olfactory detection thresholds in a systematic manner, but presence, position and configuration of a double bond did not
- The thresholds for "green odors" are generally in the higher range of thresholds compared to previously tested classes of odorants
- Spider monkeys are generally not as sensitive to "green odors" as mice and humans

*Spider monkey Nanny is indicating which paper strip she thinks is impregnated with the odorant.*