



# Rats show aversion to argon over a range of flow rates



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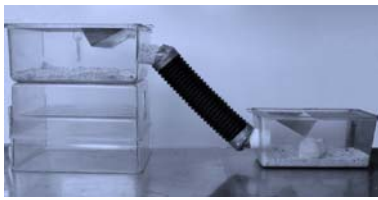
## Background

- Laboratory rodents are most commonly euthanized using CO<sub>2</sub> gas.
  - However, recent studies have shown that rats find CO<sub>2</sub> aversive.
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- Argon is a tasteless and odourless gas that may be a suitable alternative.
  - Argon acts by displacing air, which causes hypoxia and death.

## Aim

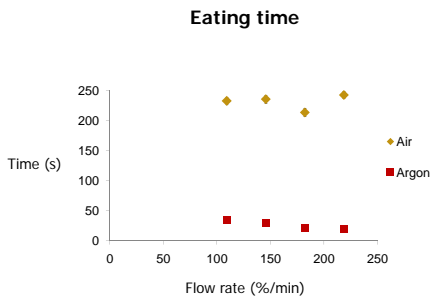
- Use approach-avoidance testing to evaluate rat responses to argon and air over a range of flow rates.

## Methodology

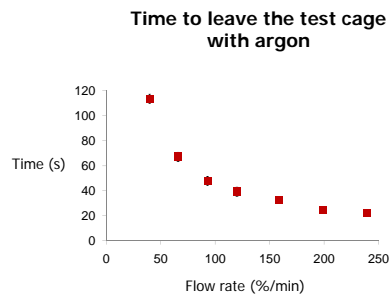


- Rats ( $n = 8$ ) were trained to enter the bottom cage for a reward of 20 Honey-Nut Cheerios.
- Air or argon was turned on as soon as rats started eating.
- We tested flow rates of 40, 66, 93, 120, 159, 199, and 239% of the test cage volume per minute.
- We recorded the time and argon concentration at which rats stopped eating and left the test cage.

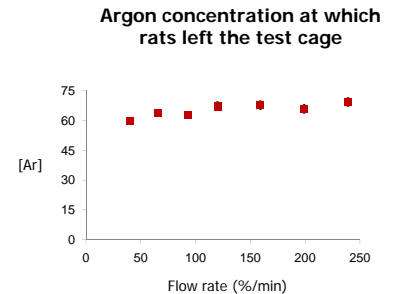
## Results



- In air trials, rats ate for an average of 4:01 min  $\pm$  0:01 with **no effect of flow rate** ( $P=0.9514$ ).
- In argon trials, rats ate for an average of 0:36 min  $\pm$  0:01 and this **eating time decreased with increasing flow rates** ( $P<0.0001$ ).



- Rats left the test cage sooner as **flow rate increased** ( $P<0.0001$ ).



- Regardless of flow rate, **rats always left the test cage between 59-69% argon**.
- The argon concentration that rats tolerated increased over the lower flow rates ( $P=0.0009$ ) but showed no further increase with the higher flow rates ( $P=0.5477$ ).

## Discussion

- The oxygen (O<sub>2</sub>) concentration corresponding to the highest argon concentration tolerated in this study is 7%. However, 7% O<sub>2</sub> is still too high to cause ataxia, unconsciousness or death in rats.
- Rats might be leaving the test cage because of a **difficulty in breathing** or because of symptoms like **light-headedness** and **cognitive impairments**.

## Conclusions

- Rats are averse to the effects of argon over a range of flow rates.
- Research into alternatives to CO<sub>2</sub> euthanasia is still required.

