How do dogs sense medical conditions in humans?

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Why is this important?

Service dogs improve the health-related quality of life in people with disabilities.
Learning the mechanisms behind dogs' ability to sense diseases can impact how we detect diseases in the future.

Hypotheses

- Dogs have the same senses as humans but, use different mechanisms.
- Dogs have the same senses as humans but, they have a more refined version.
- Dogs have different/extreme senses than humans.

Sight, Smell, Taste, Touch, Hearing

Types of medical conditions

1. Hypoglycemia in people with Type 1 Diabetes
   - A dangerous drop in blood glucose levels
2. Epilepsy
   - A seizure disorder caused by disturbed nerve cell activity
3. Cancer
   - Uncontrollable cell division throughout different parts of the body

Dogs sensing blood glucose levels

- Dogs are able to detect blood glucose levels in an individual through the scent of their breath.
- Isoprene levels approximately double in breath during a hypoglycemic event.
- Untrained dogs commonly show behavioral changes during hypoglycemic events in their owners.

Dogs sensing epileptic seizures

- Most reports of dogs detecting or predicting seizures is anecdotal.
- Seizure alert dogs work largely to protect an individual from injury.
- One recent study supports evidence that dogs are able to smell a change in body odor during a seizure.
Dogs Sensing Cancer

- Dogs have been reportedly able to detect several different types of cancer through scent.
- Types of cancers sensed: lung, breast, melanoma, ovarian, prostate and bladder.
- Dogs detect using samples of urine, breath, and tumor tissue.
- In one study a Labrador was able to detect lung cancer in 99 patients.

Results

- The most supported hypothesis is that dogs sense medical conditions through their refined sense of smell.
- More research needs to be done to isolate what compounds the dogs are identifying.

Final Questions

- What evidence supports the hypothesis that dogs sense blood glucose levels through an amplified sense of smell?
- What might a change in isoprene levels indicate?
- Why is it important to identify the compounds dogs are smelling in different types of cancers?

Fun Facts

- While a dog's brain is approximately 1/10 the size of a human's, the portion of their brain dedicated to smell is about 40x larger than ours.
- Humans have around 5 million scent receptors whereas dogs range from 125 to 300 million receptors.