Analysing the Function of M-Ras

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Background:

In order to determine the normal function of the protein M-Ras we are comparing normal (wild-type; "WT") mice with mutant mice that lack this protein ("M-Ras mice"). Since M-Ras is normally abundant in the brain, we are particularly interested in elucidating potential differences in brain-related functions, such as behaviour and memory. Sex differences can substantially impact many of these functions, which led us to study male and female mice in each group separately.

The following are descriptions of two experiments that we have carried out. I would like help with trying to determine if there are (or aren't) differences between WT and M-Ras mice.

1) Testosterone Levels

We have measured testosterone levels in male WT and M-Ras mice at three different ages (3, 6, 12 months). There are 3 groups of mice of each type, one group for each age. By looking at the averages, the testosterone levels appear to decrease in WT mice but increase in M-Ras mice over time.

I would like advice on how to best analyse these data. The questions we are trying to answer are:

a) Do testosterone levels actually do increase or decrease over time?
b) Are there significant differences between WT and M-Ras mice at certain ages?

2) Spatial Learning/Memory

In this experiment, WT and M-Ras mice (both males and females) are tested for their ability to learn to find food in three specific baited places among many more unbaited ones. Each mouse receives a total of 15 trials. The amount of time it takes for the mouse to locate and consume all three pieces of food is scored in each trial.

Again I would like advice on how to best analyse this type of data in order to tease out differences between the four groups of mice. For example, is it best to average scores for each trial number, or would I get "better" results if a threshold at a certain time is defined (i.e. a measure for "this mouse has learned the task"), and the number of such "successful" trials is scored? We are hoping to draw conclusions as to whether there are differences between males and females, and between WT and M-Ras mice, in their ability to learn this food search task.

Furthermore, if we already know from separate experiments that there are confounding factors such as anxiety, how would we factor in this information?