

In an experiment on rhesus monkeys, nerve cells emanating from the left side of the spinal cord were cut while those from the right side were left intact. During the time in which the cut cells had the opportunity to regenerate, the content of creatine phosphate (CP) was measured in the left and right portions of the spinal cord. The following table shows CP measurements in mg CP per 100 gm tissue. We wish to test if there is a difference in population mean CP between the control and experimental conditions in rhesus monkeys.

Animal	Right side (control)	Left side (regenerating)	Difference
1	16.3	11.5	4.8
2	4.8	3.6	1.2
3	10.9	12.5	-1.6
4	14.2	6.3	7.9
5	16.3	15.2	1.1
6	9.9	8.1	1.8
7	29.2	16.6	12.6
8	22.4	13.1	9.3
Mean	15.50	10.86	4.64
SD	7.61	4.49	4.89

- (a) State null and alternative hypotheses for a nondirectional (two-sided) paired t -test to compare the control and experimental means.

Solution:

$$H_0: \mu_d = 0$$
$$H_A: \mu_d \neq 0$$

- (b) Calculate the test statistic.

$$\text{Solution: } t = \frac{4.64}{4.89/\sqrt{8}} = 2.68.$$

- (c) Find the correct degrees of freedom.

$$\text{Solution: } df = 8 - 1 = 7.$$

- (d) Determine a range for the p -value.

Solution: The two sided p -value is between 0.02 and 0.04.

- (e) Would this test be significant at the $\alpha = 0.05$ significance level?

Solution: Yes, the p -value is less than 0.05.