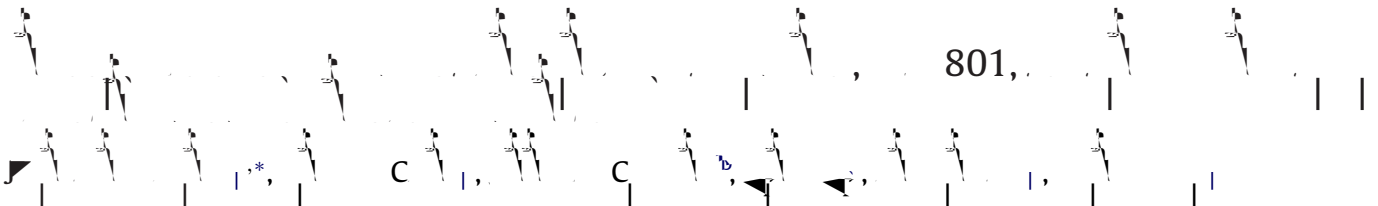
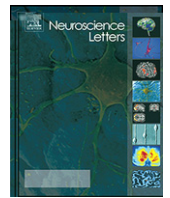




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## 1. Introduction

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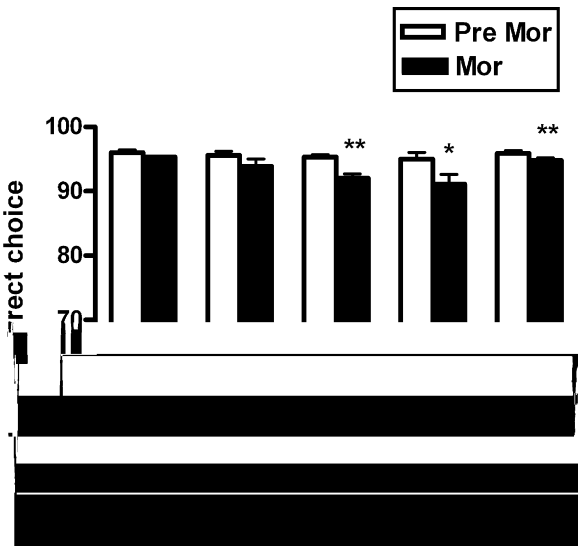
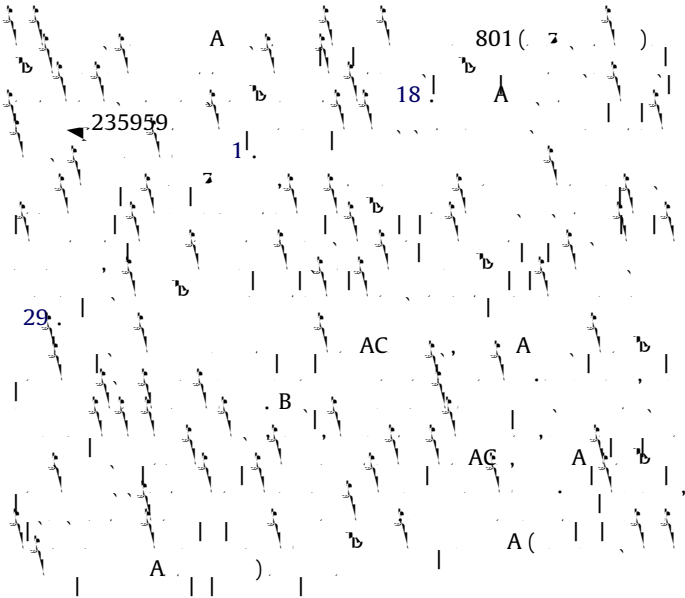


Fig. 1. ( ) (\*\* $P < 0.01$ , \* $P < 0.05$ ).



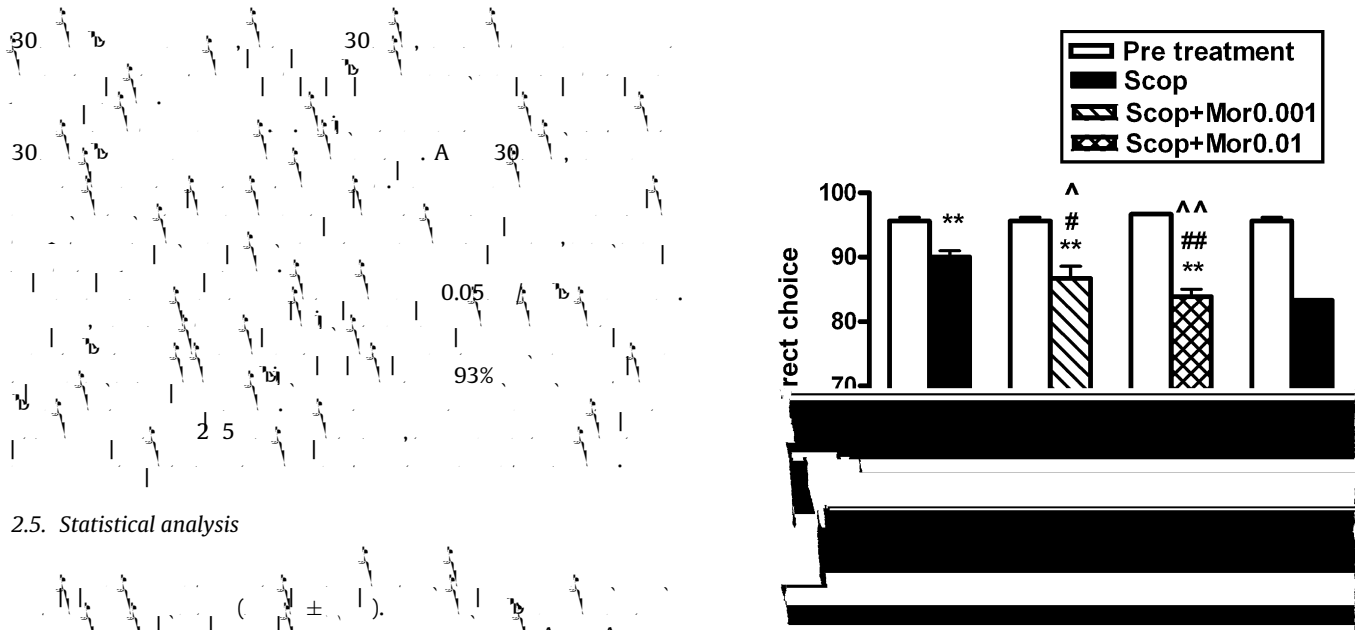


Fig. 2.

2.5. Statistical analysis

Electrophysiological traces showing neuronal firing patterns. Statistical significance is indicated by  $P \leq 0.05$ .

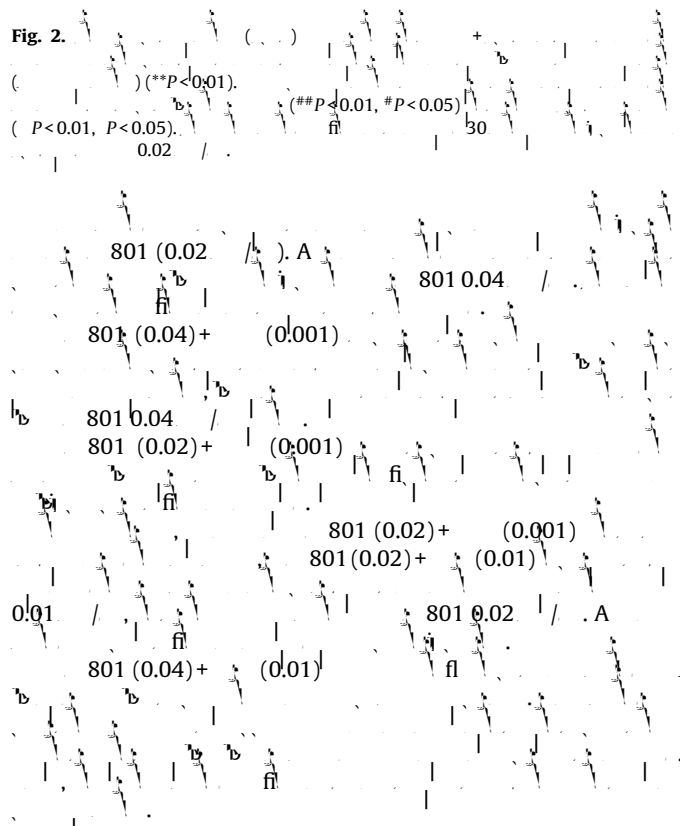
3. Results

3.1. Effects of co-administration of morphine (Mor) and scopolamine (Scop) on spatial working memory in rhesus monkeys

Statistical analysis of spatial working memory performance. Significant effects are noted with  $F(1,2) = 280.8, P = 0.004$  and  $F(5,10) = 39.5, P < 0.001$ . Other values include  $F(5,10) = 43.7, P < 0.001$ ,  $F(1,2) = 22.3, P = 0.04$ , and  $F(11,22) = 17.8, P < 0.001$ . P-values such as 0.02, 0.01, 0.001, and 0.0001 are also present.

3.2. Effects of co-administration of Mor and MK-801 on spatial working memory in rhesus monkeys

Statistical analysis of spatial working memory performance. Significant effects are noted with  $F(1,2) = 22.3, P = 0.04$  and  $F(11,22) = 25.3, P < 0.001$ . Other values include  $F(11,22) = 17.8, P < 0.001$ ,  $F(12,48) = 3.6, P = 0.001$ , and  $F(12,48) = 4.1, P < 0.001$ . P-values such as 0.04, 0.005, 0.01, 0.001, and 0.0001 are also present.



3.3. Effects of co-administration of Mor and propranolol (Pro) on spatial working memory in rhesus monkeys

Statistical analysis of spatial working memory performance. Significant effects are noted with  $F(1,4) = 36.5, P = 0.004$  and  $F(12,48) = 3.6, P = 0.001$ . Other values include  $F(12,48) = 4.1, P < 0.001$ ,  $F(1,4) = 36.5, P = 0.004$ , and  $F(1,4) = 36.5, P = 0.004$ . P-values such as 0.01, 0.05, 0.005, 0.5, and 0.4 are also present.

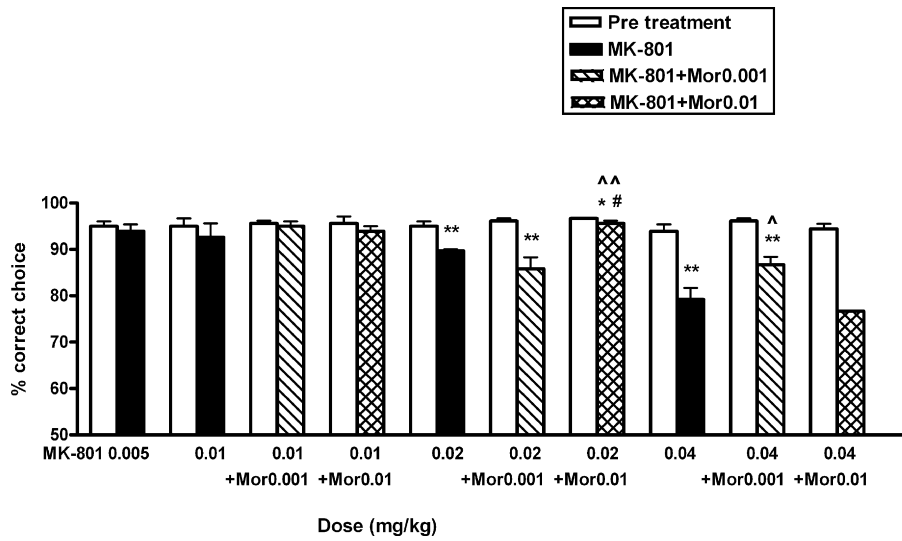
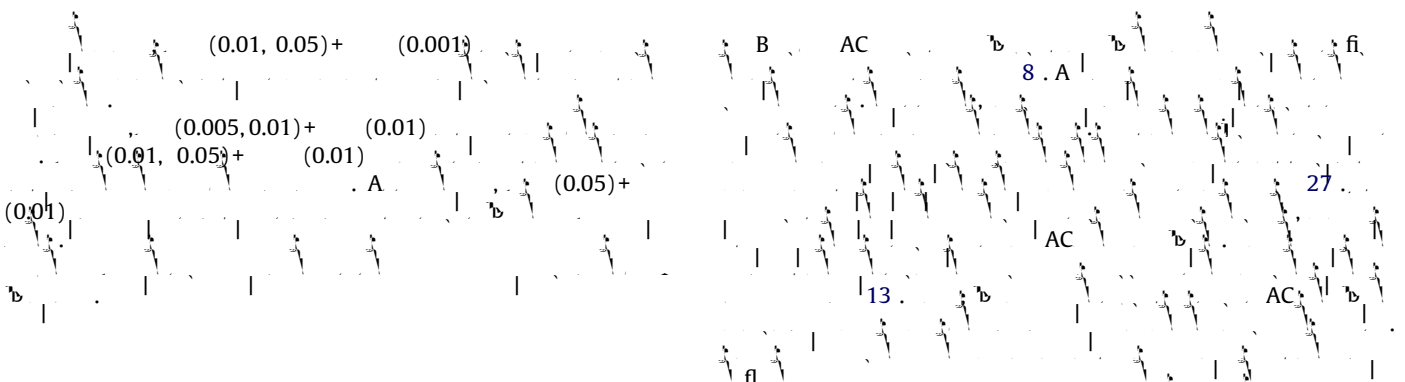


Fig. 3. 801 + 801 (#P<0.05), 801 (P<0.01, P<0.05), (\*\*P<0.01, \*P<0.05).



4. Discussion

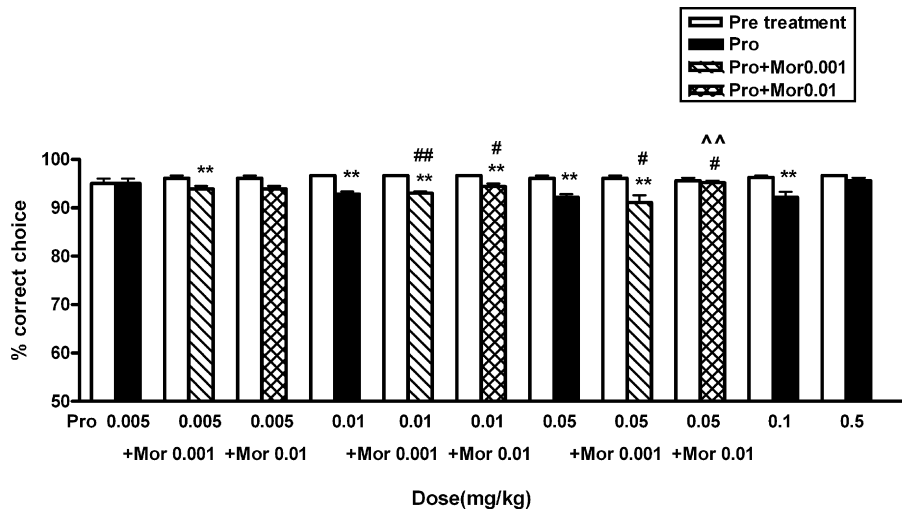
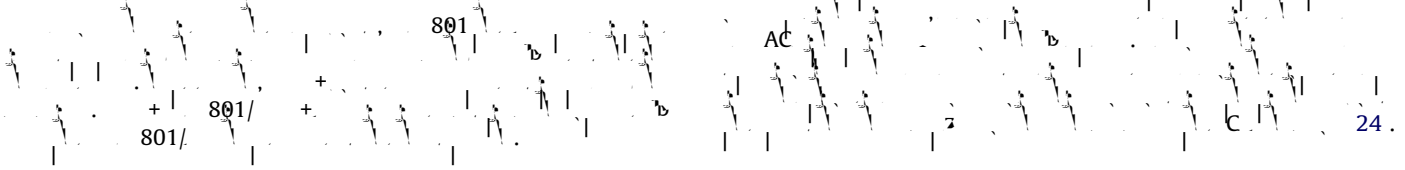


Fig. 4. (0.01, 0.05)+ (0.001), (0.01) (#P<0.05), (0.05)+ (0.01) (P<0.01), (0.01, 0.05)+ (0.01) (\*\*P<0.01), (0.01, 0.05)+ (0.01) (\*\*P<0.01), (0.01, 0.05)+ (0.01) (\*\*P<0.01), (0.01, 0.05)+ (0.01) (\*\*P<0.01).



