The actions of drugs on the guinea-pig isolated ileum - lab report example

Science, Biology

THE ACTIONS OF DRUGS ON THE GUINEA-PIG ISOLATED ILEUM

The Actions of Drugs on the Guinea-Pig Isolated Ileum Affiliation: Q: Analysis

results Agonist/antagonist combination

Log EC50 for agonist alone (mean ± s. e. m)

Log EC50 agonist in the presence of antagonist (Mean ± s. e. m)

Dose Ratio (Mean value)

Test of difference between log EC50 means using agonist and antagonist

actions of

test

t value

P value

Significant difference?

(Y/N)

Ach / antagonist X

-8. 12±0. 28

-5. 73±0. 28

245. 4700

-1. 12

2. 39

3. 51

Ach/ antagonist Y

-7. 87±0. 28

-7. 62±0. 28

1. 7782

1. 78

0. 25

1. 53

Histamine / antagonist X

-7. 37±0. 28

-7. 04±0. 28

2. 1380

-0. 13

7. 09

7. 22

Histamine / antagonist Y

-8. 03±0. 28

-6. 12±0. 28

85. 1138

-0. 60

1. 91

2. 51

s. e. m= 0. 28

The difference between means was judged to be statistically significant if the P value was highly consistent with the hypothesis.

Q2 (i): Antagonists X belongs to setron class of drugs. This class of drug acts upon the 5-HT3 receptor, which is a subtype of the serotonin receptor, located at the terminals of the vegus nerve and in certain areas of the brain. The serotonin (5-HT3) receptor antagonists aid in blocking the vomiting

reflex by inhibiting the 5-HT3 receptors in the vomiting centre, the chemoreceptor trigger zone, and in the small intestine. Antagonists Y, also branded as aprepitant, belong to the substance P antagonists (SPA) class of drugs. It mediates its effect through blocking the neurokinin 1 (NK1) receptor.

Q2 (ii): When testing the agonist action of the morphine-like drugs, it is observable that, through the depressant action of the morphine-like drugs, it was difficult to assess the potencies because the tachyphylaxis developed rapidly. In this case, it is important to use small doses of the drug while exposing the gut to the drugs at the intervals that do not go below 30 minutes. The inhibitory effect of morphine on the twitch of longitudinal muscle was induced by the coaxial stimulation, hence leading to the dose-response curve of order ●. Upon sing nalorphine-like drugs, the depressant action of the N-allyl analogue of the morphine was having the similar order to that of morphine. However, tachyphylaxis development was much more rapid with nalorphine than with morphine.

When testing the antagonist action of the morphine-like drugs, tachyphylaxis was able to develop with all compounds tested, which was a strong indication on the possibility of exhibiting antagonist action under suitable conditions. In this experiment, techyphylaxix was able to develop more rapidly than compared to using the agonist. Basing on the agonist activity of the antagonists, the conventional method used for testing antagonism did not yield the decisive results. The antagonism through low concentrations of morphine of the inhibitory effect of morphine upon twitch of the longitudinal muscle was able to induce coaxial stimulation.

Q2 (iii): Possible names of drug X are; morphine hydrochloride, levorphanol tartrate, and phenazocine hydrochloride.

Possible names of drug Y are; nalorphine hydrochloride, N-methylallynormorphine hydrochloride, levallorphan tartrate, and cyclazocine pentazocine.

Q3: Through using the experimental protocol or two log curves, there is a possibility of an error occurring. To avoid such errors, the formula can be modified into that of the critical ratio approach (CR). The CR is the concentration of agonist at the presence of the antagonist required for producing a fixed response to the linear part of the concentration. It is thus advisable to use the equation that relates CR to KB, which is expressed as;

CR = 1 + [antagonist]/KB

Whereby, KB is the equilibrium of the dissociation constant for the binding of the antagonist for the receptor.