CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)

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Project Number

S0417

Project Title

Investigating the Importance of Position 52 in Glycine Receptor Activation

Abstract

Objectives/Goals

Although alcohol#s effects on the body are known, its exact mechanisms of action are not. This study's goal is to better understand the glycine receptor. Position 52 in the amino acid sequence of this receptor has been suggested as a possible site of ethanol action. Previous studies found that a point mutation at position 52 caused an altered reaction to ethanol and glycine. We hypothesize that other substitutions at position 52 also affect the receptor#s characteristics.

Methods/Materials

Using two-electrode cell voltage clamp techniques, a concentration response of glycine and ethanol was performed on wild-type and mutant GlyRs as recombinantly expressed in Xenopus laevis oocytes.

Results

A reduced sensitivity for glycine resulted in the recombinant GlyR when compared to the wild-type GlyR. Potentiation of the GlyR#s response to glycine after a mixture of ethanol and glycine was applied also occurred.

Conclusions/Discussion

The results obtained support the hypothesis that different mutations at position 52 of the GlyR α1 subunit alter the receptor#s response to glycine, suggesting that more studies at position 52 are needed. These studies will also help isolate ethanol#s exact binding site and to better understand this receptor, as well as others that act similarly in the body.

Summary Statement

This study's goal is to better understand the glycine receptor and postion 52 of its amino acid sequence, which has been suggested as a possible site of ethanol action.

Help Received

Research was conducted at the University of Southern California under the supervision of Ronald L. Alkana PhD, Daryl Davies PhD, and Daniel K. Crawford