CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Zaven Tabakian

Project Number
S1011

Project Title
The Role of Krox-20, a Transcription Factor, in Craniofacial Muscle Development

Abstract

Objectives/Goals
To understand the effect of the Krox-20 mutant on jaw-opener development.

Methods/Materials
Mandibles with muscles attached were dissected from E14 embryos and mounted onto black filters (Millipore). Dissections were performed in Hanks Media (Gibco). Organ cultures were incubated at 37ºC with 5% CO2 in a culture medium consisting of 10% fetal calf serum (Gibco) with penicillin and streptomycin (Gibco) in BGJb (Gibco) for six days. Specimens were subsequently fixed overnight in 10% buffered formalin and then dehydrated in graded ethanols and embedded in paraffin. The paraffin-embedded blocks were serially sectioned at 6 µm. For every group of twenty sections, ten serial sections were processed for counterstaining with hematoxylin and eosin and the other ten serial sections were processed for either TUNEL staining using the In Situ Cell Death Detection Kit (Roche) or for proliferating cell nuclear antigen (PCNA) expression, using the PCNA Staining Kit (Zymed). Cell counting procedures were performed for all these studies and one- way ANOVA were conducted to determine differences between genotypes.

Results
Krox-20 null mutation impacts the development of masticatory muscle development.

Mandibular/jaw-opener muscle organ culture preparation supports the growth of jaw-opener musculature.

The Krox-20 null mutation does not influence jaw-opener muscle proliferation.

The Krox-20 null mutation increases cell death in jaw-opener musculature.

Conclusions/Discussion
Krox-20 expression has a role in maintaining jaw-opener musculature.
Krox-20 expression suppresses cell death programs.

Data suggest that a muscle disorder may be implicated in the disease course associated with EGR2 mutations that result in feeding disorders.

Summary Statement
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Help Received
Jack Turman, Jr. Ph.D., Shampa De, Daniel Li