



**CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY**

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Project Title Actin and Actin Associated Proteins: A Developmental Study	
Abstract Objectives/Goals Actin and actin associated proteins are involved in thin filament regulation which is important in the regulation of vessel contraction. The goal of this project is to find out how the expression of actin and the major actin associated protein (actinin, vinculin, talin, and paxillin) changes with development from immature fetus, term fetus, newborn, to adult. This study will help us understand more details about cerebral vessel contraction mechanisms and the regulation of blood flow. Methods/Materials We will use common carotid artery from the 96-day, 140-day gestation age fetuses, newborn lamb, and adult sheep for this study. Immediately following sacrifice we will remove the common carotid arteries (CCA), clean them in the Krebs buffer and rapidly freeze them in liquid nitrogen. Frozen samples will be homogenized in the lysing buffer. Nuclei and debris will pellet with centrifugation at 14,000 g for 20 min. The whole cell lysate will be stored at -80°C. We will use the Western Immunoblotting technique to quantify the expressions of actin, actinin, vincullin, talin and paxillin. Results 1. In sheep common carotid artery, α -actin expression did not change with development from 96-, 140-gestation day fetus, to newborn, and to adult. 2. In the four experimental age groups, the expression of actin associated proteins vinculin and actinin had no significant difference. 3. The expression level of talin was low in both fetal groups and dramatically increased in newborn sheep then decreased to fetal level in adult common carotid. 4. Although the paxillin expression did not change with development, phosphorylated paxillin (the active form of paxillin) showed significant differences between the four age groups. 95-day and the 140-gestation day fetuses had similar low level of phosphorylated paxillin expression. Conclusions/Discussion In this study, we found that expression levels of several actin associated proteins changed with developmental age. In a previous study it was shown that for a given potassium concentration, vessels from two fetal groups had smaller contraction response than the newborn and adult vessels. This might, in part be due to the differences in actin associated protein expressions. This project provided us with a strong foundation which we will use to further understand the mechanisms involved in blood vessel contraction and blood flow regulation.	
Summary Statement In this opening study of maturation affects on actin and actin associated proteins, we found that expression levels of several actin associated proteins changed, which is significant in our growing understanding of blood vessel contractions	
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