CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
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Project Number
S1001

Project Title
The Characterization of Dental Papillae Mesenchyme (DPM) Cell Lines

Abstract

Objectives/Goals
To show that several types of DPM cells are present in the tooth where only some are able differentiatie into odontoblast, leading to dentine formation.

Methods/Materials
Cell Culture: The cells were first grown at 33oC in 60-mm Petri dishes with permissive media containing ƒ#-interferon so the cells become confluent. This is important because this media induces the production of H-2Kb Promoter, which in turn makes SV40 T-Large Antigen and allows the cells to grow ad infinitum. Cells were then incubated at 39oC with differentiating media containing ƒO-glycerophosphate and L-ascorbic acid. This differentiating media was essential in promoting cell mineralization.
RNA Isolation and Reverse Transcription: My DPM E-16 cell lines were grown at 0, 5, 10, 15, 20, and 25 days while the DPM G005 cell lines were grown at 7, 14, 28, and 36 days. RNA at each day increment was isolated from these cells. In order to determine the concentration of the RNA, a small sample placed in a spectrophotometer and the absorption was read at 260nm. The concentration is important because it helps determine the volume needed so that each experiment sample will have the same RNA quantity. RNA was then converted into cDNA.
PCR (Polymerase Chain Reaction): PCR was used to amplify the cDNA for viewing. Makes billions of copies of cDNA strand in short amout of time.
Agarose Gel Electrophoresis: In order to view cDNA amplification after PCR is run. If bands are seen, the gene was expressed.

Results
Many of the same genes were expressed by my DPM G005 and DPM E-16 cell lines. However, Osteocalcin and DMP-1, both important in assisting dentine formation was shown to be expressed in my G005 samples while they were not expressed at all in my E-16.

Conclusions/Discussion
This finding has suggested that these two cell lines, though the same kind of cells, have two destined paths. The G005 will later go on to differentiate in to odontoblast, resulting in dentine while the E-16 will not.

Summary Statement
Determining if all DPM cells are destined to differentiate into odontoblast and later form dentine

Help Received
Used lab equipment at University of Southern California under the supervision of Dr. Magarita Zeichner-David.