# *Abstract*

***www.nih.org***

**Grant Number:** 1R01CA096838-01A1
**PI Name:**
**PI Email:**
**PI Title:**
**Project Title:** Novel, Noninvasive Biomarker of Fruit & Vegetable Intake

***Abstract:*** *Epidemiologic studies of fruits/vegetables and chronic disease have been limited by the lack of non-invasive objective biomarkers of dietary intake/dietary adherence to interventions. Blood concentrations of carotenoids are considered the best biological markers of fruit and vegetable intake, but require venipuncture and are prohibitively expensive for large cohort studies and intervention trials. Carotenoids are found in many human tissues including skin, and skin concentrations of carotenoids (from dermal biopsies) have been shown to be strongly and significantly correlated with plasma concentrations of the same carotenoids (e.g., beta-carotene, r=0.75). We propose to adapt an existing technology,* ***Raman*** *spectroscopy, for the assessment of the* ***carotenoid*** *status of human tissues in vivo as a biomarker of fruit and vegetable intake. More specifically, we propose to (i) refine our current instrument such as to have a rugged, portable device for rapidly assessing* ***carotenoid*** *status ill human skin in vivo. Once our protype instrument is appropriately refined, we then propose to (ii) evaluate the reproducibility, intra-subject variability, and inter-subject variability in dermal cartenoid levels as estimated by* ***Raman*** *spectroscopy at one time and over time. Upon completion of this aim, our final aim is to (iii) determine the correlation between* ***carotenoid*** *status as assessed by* ***Raman*** *spectroscopy and other measures of* ***carotenoid*** *status including dietary intake of fruits/vegetables and specific carotenoids, plasma* ***carotenoid*** *concentrations and carotenioid concentrations in dermal biopsies. This promising technology is currently being developed/refined for the assessment of carotenoids in human retinal tissue (National Eye Institute); the current proposal would greatly broaden the potential use of this noninvasive technology for cancer epidemiology and prevention studies.* ***Raman*** *spectroscopic technology has tremendous potential as a breakthrough method for rapid screening of* ***carotenoid*** *levels in large populations, and development and validation are critically required to move this technology into human population research and surveillance.*

***Thesaurus Terms:***
*biomarker, fruit, nutrient intake activity, technology /technique development, vegetable* ***carotenoid****, skin, tomato* ***Raman*** *spectrometry, biopsy, clinical research, high performance liquid chromatography, human middle age (35-64), human subject, questionnaire, young adult human (21-34)*

| | |
|---|---|
| **Institution:** | YALE UNIVERSITY |
| | NEW HAVEN, CT 06520 |
| **Fiscal Year:** | 2003 |
| **Department:** | EPIDEMIOLOGY AND PUBLIC HEALTH |
| **Project Start:** | 08-MAY-2003 |
| **Project End:** | 30-APR-2006 |
| **ICD:** | NATIONAL CANCER INSTITUTE |
| **IRG:** | EDC |