Epigenetic and Biotransformation Effects of Hookah Smoke Extract on Human Oral Keratinocytes

Zaman, Anusha

The practice of smoking hookah, a traditional smoking apparatus that uses charcoal to indirectly heat shisha tobacco, as a possible alternative to cigarettes is an emerging trend of global significance. It is most prevalent among youth, especially in the United States of America, and may be an underlying cause of the billion tobacco-related deaths projected to occur in the twenty-first century. Despite the epidemic proportions of its spread, studies on the hookah are few and of wide scope, not concerning effects of hookah at the molecular level. Therefore, this study was designed to investigate cellular and molecular responses to hookah smoke treatments in human oral keratinocytes. As many hookah smoke components resemble those of cigarette smoke, genes with prominence in detoxification pathways of xenobiotic metabolism, epigenetic function, or cancer-related influence, and relevance to cigarette-related health effects were selected. CYP1A1, CYP1B1, AHRR, HMOX1, IL8, PTGS2, MMP9, MMP12, SOD2, TIMP1, SERPINA1A were significantly upregulated. SOD1, PLAUR, DNMT3A, HDAC11 were significantly downregulated. This dysregulation is concurrent with evidence of a carcinogenic aspect, and that changes were translated into expression of active correlating proteins. This study therefore concludes that hookah smoke produces adverse effects on human health similar to those produced by cigarette smoke.

Awards Won:
Third Award of $1,000
National Institute on Drug Abuse, National Institutes of Health &amp the Friends of NIDA: First Award of $2,500