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Colorblindness and scientific figures: evaluation of *microshades* color palette accessibility for color vision deficiency (CVD) in taxonomic stacked bar plots.

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Abstract

The field of microbiome research has grown exponentially in both popularity and importance over the past decade. Microbiome data consists of highly dimensional and complex information. Taxonomic abundance stacked bar plots are commonly used to provide a broad overview of microbiome data and to pinpoint specific taxa of interest for further analysis. These scientific plots use color to convey complex information, making interpretation difficult for those with CVD who cannot perceive the entire spectrum of color and struggle to differentiate between certain hues. Two of the most popular tools for microbiome data analysis are Bioconductor in R and QIIME 2 in Python. Although Bioconductor and QIIME 2 are widely used analysis tools, they do not give users the option to apply color palettes which are both CVD-accessible and include enough hues to guarantee that individual shades will be distinguishable.

The *microshades* package, created by the Karstens Lab at OHSU, aims to improve readability of taxonomic abundance stacked bar plots and provides a CVD-accessible color palette specifically designed for highly dimensional data. However, the *microshades* package has not been rigorously tested. To assess if the *microshades* color palette significantly improves accessibility of the plots published in microbiome literature for those with CVD, we surveyed microbiome scientists with and without CVD. Each scientist was asked to evaluate the accessibility of taxonomic abundance plots in both their original published color palette and re-colored in the *microshades* CVD color palette. Scientists were assigned to either a survey showing images with a CVD simulation or a control survey (no simulation). Preliminary results of the survey will be presented.