**Aneuvis: Reproducible web-based visualization of aneuploidy in single cells**

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**Abstract**

Aneuploidy is a predisposing factor for cancer. There are traditionally two main methods for detecting aneuploidy in research and clinical practice. Molecular cytogenetic approaches, often used in clinical practice, involve direct visualization of interphase or metaphase preparations of chromosomes using fluorescent probes. More recently, whole genome sequencing has been utilized to discern chromosomal copy number at high resolution. Each of these approaches has their advantages and disadvantages, and an integrated analysis would aid in the better understanding of the strengths and limitations of these methods. Here, we develop a web-based tool, termed Aneuvis, that allows users to upload molecular cytogenetic or processed whole-genome sequencing data. Aneuvis automatically constructs visualizations and summary statistics and generates a reproducible report that can be used to customize output. We present the first web-based tool that incorporates both molecular cytogenetic and whole genome sequencing data. Aneuvis will highlight molecular heterogeneity both within and between different approaches and help distinguish cell populations.

**Introduction**

In humans, alterations in chromosome number are a source of congenital disease and a predisposing factor for carcinogenesis. Increased variability in the karyotypes of cancer cell populations is also associated with resistance to chemotherapy and poor clinical outcomes. Alterations in chromosome number is also a sign of chromosomal instability, which can lead to cancer therapeutic resistance. Alterations can take place as departures from an integer-valued set, known as polyploidy. There are two major methods for detecting alterations in chromosome number --

In a cell, there are three possible states that a set of chromosomes can have. Diploidy refers to the presence of two copies of each chromosome. Polyploidy refers to an integer-values increase in the number of chromosomes, often resulting from whole-genome duplication. The presence of WGD alters sensitivity of cells to potential cancer therapeutics and is thus important to detect1,2.

Instavility

Invisibility

SUMCIN CIN-VIS

*Whole chromosome instability*

Whole chromosome instability is thought to arise from the missegregation of chromosomes during mitosis.

*Drivers of aneuploidy*

*Measuring aneuploidy*

Whole genome sequencing

FISH

Fluorescence in situ hybridization is an approach that uses fluorescently-labeled DNA-based probes to

Chromosomal copy number variation variation Aneuploidy is The drivers of aneuploidy are unclear. Understanding how molecular stressors are

In a cell, there are three possible states

**Results**