Tissue Grinder Descriptions and Recommended Uses

Abstract

There are many methods available to breakdown tissue and cells. Mortar and pestle tissue grinders are commonly used due to their gentle grinding action, which helps to preserve large molecules, organelles, cells, and viruses. General usage and a description of the various types of tissue grinders are described.

Why Use Mortar & Pestle Tissue Grinders

Mortar and pestle tissue grinders are commonly used for opening cells to isolate proteins, DNA, RNA and antibodies. They are also used to separate cell organelles and viruses from cells. These are often large molecules or objects that are susceptible to damage. Mortar and pestle tissue grinders are gentler than most other grinding methods, so there is greater recovery of intact molecules, organelles, or viruses. In addition, the gentle grinding makes these tissue grinders useful for breaking tissues down for primary cell culture. Mortar & pestle tissue grinders are easy to use. They consist of only a few parts. Most Wheaton tissue grinders are comprised of interchangeable parts, so there is no concern about matching components for correct sizing after washing in busy labs. This also allows for the easy purchase of replacement parts in case of breakage. Because mortar & pestle tissue grinders are often hand-operated, friction is kept to a minimum, which reduces the amount of heat transferred to the sample, increasing yields of cell products.

General Procedures

Cells collected from cell culture are collected and concentrated if needed. They are ground according to a specific protocol. If a Dounce tissue grinder is used, the protocol refers to a number of strokes.

For other grinders, the time and possibly the RPM are specified for grinding.

When grinding tissues, the sample is trimmed to remove unwanted material. The tissue is chopped using crossed scalpels to a size of 1-3 mm. These pieces are placed in the tissue grinder. Again, a specific protocol that defines the number of strokes or time period is used.

These protocols are determined empirically or a protocol using a similar sample may be used.

Tissue Grinder Choice

Mortar & Pestle tissue grinders are used for their gentle action, which reduces damage to large molecules, organelles, and viruses or the cells. However, there is a large choice of tissue grinders.

Dounce Tissue Grinder

Dura-Grind® Stainless Steel Dounce Tissue Grinder

Dounce Tissue Grinder

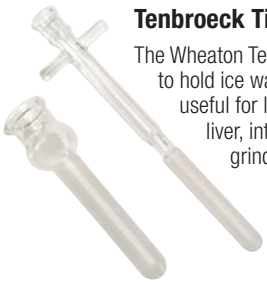
One of the most popular tissue grinders is the Wheaton Dounce tissue grinder, typically used to open cells to release produced molecules, organelles, or viruses. The Dounce tissue grinder is usually used on cell pellets rather than excised tissue. This tissue grinder works by squeezing cells and suddenly releasing pressure as the pestle is moved. The Wheaton Dura-Grind® Dounce tissue grinder is constructed of stainless steel, and helps to keep the sample cool. Most Dounce tissue grinders are packaged with two mortars. The loose mortar is used for initial grinding, and the procedure is finished with the tight mortar. The two mortars reduce effort. This grinder is inefficient when the mortar is pressed to the bottom of the pestle and rotated. Dounce tissue grinders are used by moving the pestle up and down for a specified number of strokes.

Potter Elvehjem Tissue Grinder

The Wheaton Potter-Elvehjem tissue grinder is a good general-purpose tissue grinder. It can be used to break excised culture down for primary cell culture. This tissue grinder is generally used with soft tissue such as brain and liver. The serrated Potter-Elvehjem is used to reduce effort because the serrations breakdown the larger pieces first. This tissue grinder works by the shear forces generated by the moving liquid trapped between the stationary mortar and the moving pestle. Potter Elvehjem tissue grinders with a metal shaft may be used with the Wheaton Overhead Stirrer (903475).

Tapered Tissue Grinder

The Wheaton Tapered Tissue Grinder has many uses. Its primary use is to break dissected tissue down. It is commonly used for tougher tissue than the Potter-Elvehjem, such as heart, muscle or lung. The tapered section helps to break down the tissue initially, while the straight portion grinds material via shear forces as in the Potter-Elvehjem grinder. This tissue grinder works by the shear forces generated by the moving liquid trapped between the stationary mortar and the moving pestle. Tapered tissue grinders with a metal shaft may be used with the Wheaton Overhead Stirrer (Cat. No. 903475).



Tenbroeck Tissue Grinder

The Wheaton Tenbroeck tissue grinder has a hollow handle to hold ice water to cool the sample. This feature makes it useful for labile samples, or for preserving cells such as liver, intestines or heart. In addition to fragile cells, this grinder is used for the isolation of molecules.