

Product Name

Name: Potassium Chloride Solution (0.075 M)

Cat. No.: C3540-0100, C3540-0500

Size: 100 mL, 500 mL

Product Description

Potassium Chloride 0.075 M is a hypotonic solution, utilized for the preparation of blood lymphocyte chromosomes. Hypotonic treatment with KCl, often with the addition of sodium citrate is used most often to enhance membrane permeability and induce hypotonic cell swelling at either room temperature (15-30°C) or 37°C. Usually, the higher temperature is used to increase metaphase spreading. There are several factors that influence the extent of hypotonic treatment utilizing KCl and/or sodium citrate:

- Cell density
- Specimen type (e.g., slides or cell pellet)

It is important to note that the type, extent, and application of hypotonic treatment is determined for the most part, empirically, in the laboratory by trial-and-error and therefore may need to be modified from time to time to meet certain particular requirements and/or applications.

Metaphase Spread

The metaphase spread is the beginning of chromosomal analysis, most often a very labor-intensive procedure in which cells derived from amniotic fluid, blood, bone marrow, chorionic villi, or other tissues are grown in culture. A random distribution of chromosomes must be displayed in an easily defined arrangement or format. In order to effectively and efficiently evaluate and analyze the number and structural normality of each chromosome, the process of pairing them takes place by segueing into a karyotype which is an orderly arrangement of the metaphase spread of chromosomes.

Hypotonic Treatment

When evaluating peripheral blood lymphocyte cytogenetic changes such as detecting karyotype aberrations and/or recurring structural chromosome abnormalities, chromosome preparations especially from actively dividing cell cultures do not always produce a rewarding metaphase spread or yield and, in such cases, hypotonic treatment is often thought to be a most relevant factor for an acceptable outcome. This is where KCl and/or sodium citrate come into play. After the lymphocytes are grown in culture and then subsequently cultured again in a medium of choice with PHA-M and 10% FBS, they may be treated with or without Colcemid Solution depending upon the method utilized. Afterwards they are subject to a hypotonic treatment varying in length depending on the work protocols. The hypotonic treatment is used to enlarge cells for adequate spreading of metaphase chromosomes. Then, fixation and/or slide preparation complete the whole process.

Peripheral Blood Lymphocytes

Peripheral blood lymphocytes also known as PBL's are the mature lymphocytes that circulate in the blood

rather than localizing in the organ systems such as the spleen or lymph nodes. In its normal environment and in most vertebrates, a cell is bathed in a fluid similar to its contents. If the fluid content within and outside the cell are about equal, this is known as an isotonic or isosmotic solution where, in this case, no net flow of fluid may occur. However, if the cell is placed within a new environment such as culture media, far-reaching changes may occur if the in vitro environment does not mimic the in vivo environment to the nth degree. However, in cell culture, we artfully create situations to meet our requirements.

In some appropriate hypotonic solutions, cultured mammalian cells may rapidly increase in volume and then shrink gradually over a relatively short period of time within 20 - 30 minutes at 37°C. However, for example, an animal cell placed in a hypertonic solution (i.e., which has a higher osmotic pressure) will lose intracellular fluids to the surrounding and thus shrink or contract.

If we take another example in contrast to the aforementioned, an animal cell such as a lymphocyte placed in a hypotonic or perhaps a hypoosmotic environment would be unable to maintain its equilibrium and thus lose its shape because it will gain water (i.e., more water will flow into the cell than out of it). In this case, the pressure or concentration inside the cell is greater and the solvent would continue to diffuse across the cell membrane causing the cell to eventually burst. The rupture of any cell by a hypotonic solution is known as plasmolysis, if however, it occurs within an erythrocyte or RBC, and it is known as hemolysis, whereas the shrinking or shriveling of the inside of RBC is known as crenation.

Predominant Characteristics

- Sterile & easy-to-use
- Increases metaphase spread of peripheral blood lymphocytes (PBL's)
- Very similar properties to its relative NaCl

Although each batch of Potassium Chloride (KCl) 0.075 M Solution is tested for performance, the use of VivaCell's KCl does not guarantee the successful outcome of any diagnostic testing.

Storage and Stability

The product should be kept at **2 - 8°C**.

Shelf life: 36 months from date of manufacture.

Procedure

1. Take a bottle of Potassium Chloride (KCl) 0.075 M Solution from the refrigerator at 2 - 8°C and read the label.
2. Wipe the outside of the bottle with a disinfectant solution such as 70% ethanol.
3. Pipette out appropriate volume using an aseptic/sterile technique under a laminar-flow culture hood.

Quality Control

Potassium Chloride Solution is tested for sterility, osmolality.

Precaution and Disclaimer

For research use only, not for clinical diagnosis, and treatment.