DOWNLOAD PDF STABILITY OF INSULIN

Chapter 1 : Insulin Storage and Syringe Safety: American Diabetes AssociationÂ®

Stability of Common Insulins in Pens and Vials1,2 Diabetes in Control is a medical e-newsletter dedicated to keeping clinicians current with the rapid changes in diabetes care.

Listen Insulin Storage and Syringe Safety Although manufacturers recommend storing your insulin in the refrigerator, injecting cold insulin can sometimes make the injection more painful. To avoid this, many providers suggest storing the bottle of insulin you are using at room temperature. Insulin kept at room temperature will last approximately 1 month. Remember though, if you buy more than one bottle at a time to save money, store the extra bottles in the refrigerator. Then, take out the bottle ahead of time so it is ready for your next injection. Here are some other tips for storing insulin: Do not store your insulin near extreme heat or extreme cold. Never store insulin in the freezer, direct sunlight, or in the glove compartment of a car. Examine the bottle closely to make sure the insulin looks normal before you draw the insulin into the syringe. If you use regular, check for particles or discoloration of the insulin. If you use NPH or lente, check for "frosting" or crystals in the insulin on the inside of the bottle or for small particles or clumps in the insulin. Syringe Reuse Reusing syringes may help you cut costs, avoid buying large supplies of syringes, and reduce waste. However, talk with your doctor or nurse before you begin reusing. They can help you decide whether it would be a safe choice for you. If you are ill, have open wounds on your hands, or have poor resistance to infection, you should not risk insulin syringe reuse. Syringe makers will not guarantee the sterility of syringes that are reused. Here are some tips to keep in mind when reusing syringes: Never let the needle touch anything but clean skin and the top of the insulin bottle. Cleaning it with alcohol removes the coating that helps the needle slide into the skin easily. If you can do it safely, clip the needles off the syringes so no one can use them. Do not use scissors to clip off needles â€” the flying needle could hurt someone or become lost. Place the needle or entire syringe in an opaque not clear heavy-duty plastic bottle with a screw cap or a plastic or metal box that closes firmly. Do not use a container that will allow the needle to break through, and do not recycle your syringe container. Your area may have rules for getting rid of medical waste such as used syringes. Ask your refuse company or city or county waste authority what method meets their rules. The CDC has more information about safe needle disposal in your area. When traveling, bring your used syringes home. Pack them in a heavy-duty holder, such as a hard plastic pencil box, for transport.

Chapter 2 : Storage of Insulin - Consumer Med Safety

The stability of seven types of pharmaceutical insulin preparations was determined by a bioassay (mouse convulsion method) and a radioimiminoassay after storage for different periods at 4Â° C., 15Â° C., 25Â° C., 37Â° C., or 45Â° C. in the dark.

Insulin is very sensitive to sunlight, indoor lights, and to extremely hot or cold temperature. Insulin is not OK to use if exposed to very hot or cold weather. The expiration date will usually be 1 year from the date of purchase but you have to check the box to find out. Once open there are different storage needs for insulin. What does OPEN mean? This does NOT mean removed from the box. OPEN means the insulin cap is removed and the rubber stopper was punctured. Vials and pens have different needs for storage. These differences can lead to confusion. Therefore, it is very important for you to become familiar with the recommendations for the insulin product that you use. What is an OPEN vial? Once the vial is punctured, it is OPEN. Once you stick a needle in the vial, it is OPEN. Regardless of where it is stored, OPEN insulin will only last 28 days before it must be thrown in the trash. Insulin kept in the fridge should be removed and allowed to reach room temperature before injection. Once used for the first time, insulin pens should not be stored in the fridge. The number of days you can use the pen will depend on which pen you use. Talk to your doctor or pharmacist. The number of days depends on which pen you use. Do not keep in hot places. Do not leave insulin in a hot closed car. Heat makes insulin break down and will not work well to lower your blood sugar. Do not keep in freezing places. Never store in a freezer. If insulin is frozen, do not use. You will not be able to inject the insulin if it is frozen. Do not use even after thawing. Freezing temperature will break down the insulin and then it will not work well to lower your blood sugar. Throw frozen insulin in the garbage. Do not leave in sunlight. Light can make insulin break down and then it will not work well to lower your blood sugar. Never use insulin if expired. The expiration date will be stamped on the vial or pen. Remember if not in the fridge, the date on the vial or pen does not apply. You must throw away after 28 days since outside the fridge. Write the date on the insulin vial on the day you open it or start keeping it outside the fridge. This will help you remember when to stop using it. Throw the insulin away 28 days after opened or since kept out of the fridge. Inspect your insulin before each use. Look for changes in color or clarity. Look for clumps, solid white particles or crystals in the bottle or pen. Insulin that is clear should always be clear and never look cloudy.

Chapter 3 : Insulin structure and stability.

The insulin hexamer forms a relatively stable unit but some flexibility remains within the individual molecules. The intrinsic flexibility at the ends of the B chain plays an important role in governing the physical and chemical stability of insulin.

Bovine insulin differs from human in only three amino acid residues, and porcine insulin in one. Even insulin from some species of fish is similar enough to human to be clinically effective in humans. Insulin in some invertebrates is quite similar in sequence to human insulin, and has similar physiological effects. The strong homology seen in the insulin sequence of diverse species suggests that it has been conserved across much of animal evolutionary history. The C-peptide of proinsulin discussed later , however, differs much more among species; it is also a hormone, but a secondary one. SS-linked insulin monomer The primary structure of bovine insulin was first determined by Frederick Sanger in The hexamer is an inactive form with long-term stability, which serves as a way to keep the highly reactive insulin protected, yet readily available. The hexamer-monomer conversion is one of the central aspects of insulin formulations for injection. The hexamer is far more stable than the monomer, which is desirable for practical reasons; however, the monomer is a much faster-reacting drug because diffusion rate is inversely related to particle size. A fast-reacting drug means insulin injections do not have to precede mealtimes by hours, which in turn gives people with diabetes more flexibility in their daily schedules. This can cause injection amyloidosis , and prevents the storage of insulin for long periods. These stimuli include ingested protein and glucose in the blood produced from digested food. If the carbohydrates include glucose, then that glucose will be absorbed into the bloodstream and blood glucose level will begin to rise. In target cells, insulin initiates a signal transduction , which has the effect of increasing glucose uptake and storage. Finally, insulin is degraded, terminating the response. Insulin undergoes extensive posttranslational modification along the production pathway. Production and secretion are largely independent; prepared insulin is stored awaiting secretion. Both C-peptide and mature insulin are biologically active. Cell components and proteins in this image are not to scale. In mammals, insulin is synthesized in the pancreas within the beta cells. One million to three million pancreatic islets form the endocrine part of the pancreas, which is primarily an exocrine gland. Insulin consists of two polypeptide chains, the A- and B- chains, linked together by disulfide bonds. It is however first synthesized as a single polypeptide called preproinsulin in beta cells. Preproinsulin contains a residue signal peptide which directs the nascent polypeptide chain to the rough endoplasmic reticulum RER. The signal peptide is cleaved as the polypeptide is translocated into lumen of the RER, forming proinsulin. About 5â€”10 min after its assembly in the endoplasmic reticulum, proinsulin is transported to the trans-Golgi network TGN where immature granules are formed. Transport to the TGN may take about 30 min. Proinsulin undergoes maturation into active insulin through the action of cellular endopeptidases known as prohormone convertases PC1 and PC2 , as well as the exoprotease carboxypeptidase E. After cleavage of the C-peptide, these 2 pairs of basic residues are removed by the carboxypeptidase. The resulting mature insulin is packaged inside mature granules waiting for metabolic signals such as leucine, arginine, glucose and mannose and vagal nerve stimulation to be exocytosed from the cell into the circulation.

Chapter 4 : Insulin - Wikipedia

This book reviews stability aspects encountered since the pioneering isolation of insulin in An introductory chapter, treating insulin purity and stability in historical perspective, is followed by a chapter with a description of the structure of insulin.

Chapter 5 : Questions about Multi-dose vials | Injection Safety | CDC

Information on specific insulin products were gathered from most recent package inserts and communication with

manufacturing companies in- cluding Aventis, Eli Lilly and Company, and Novo Nordisk.