Insulin is the primary hormone responsible for controlling the cellular uptake, utilization, and storage of glucose, amino acids, and fatty acids while inhibiting the breakdown of glycogen, protein, and fat. Several reviews of the biochemistry, physiology, and pharmacology of insulin have been published.\(^5\) The insulin receptor is a tyrosine kinase that phosphorylates the insulin receptor substrate (IRS-1) found in most cell types. IRS-1 activates phosphatidylinositol 3 kinase (IP3 Kinase).\(^10\) The \(K_d\) for insulin at its receptor is \(\sim 0.5\) nM (\(\sim 2.9\) ng/ml).\(^12\)

Bovine insulin is often included as a medium supplement for cell culture. The concentration range is 1–10 \(\mu\)g/ml depending on the cell type.\(^3\)

**Precautions and Disclaimer**

This product is for R&D use only, not for drug, household, or other uses. Please consult the Safety Data Sheet for information regarding hazards and safe handling practices.

**Storage/Stability**

Store insulin at \(-20\) °C protected from moisture.

Insulin has low solubility at neutral pH. It can be solubilized at 2 mg/ml in dilute acetic or hydrochloric acid, pH 2–3. A stock solution can be stored frozen at \(-20\) °C in single-use aliquots. Freeze-thaw cycles should be avoided.

Alternatively, insulin can be stored for up to 12 months at 2–8 °C if it is sterile filtered through a low protein binding membrane or if it contains a suitable bacteriostat, such as 0.1% thimerosal or sodium azide. Insulin solutions cannot be autoclaved. Insulin can also be solubilized in 125 mM NaHCO\(_3\).\(^15\) However, alkaline stock solutions are not recommended since high pH increases the rate of deamidation and aggregation.
References

2. CRC Handbook of Biochemistry (1968) p C-10.