Insulin detemir (in-su lin-de-te-mir)

**High Alert**

### Classification
Therapeutic: antidiabetics, hormones  
Pharmacologic: pancreatics

### Pregnancy Category B

#### Indications
Control of hyperglycemia in patients with type 1 (IDDM) and type 2 (NIDDM) diabetes mellitus.

#### Action
Lower blood glucose by: stimulating glucose uptake in skeletal muscle and fat, inhibiting hepatic glucose production. Other actions of insulin: inhibition of lipolysis and proteolysis, enhanced protein synthesis. **Therapeutic Effects:** Control of hyperglycemia in diabetic patients.

#### Pharmacokinetics
**Absorption:** Delayed and prolonged.  
**Distribution:** Identical to endogenous insulin.  
**Metabolism and Excretion:** Metabolized by liver, spleen, kidney, and muscle.  
**Half-life:** 5–7 hr (dose-dependent).

#### TIME/ACTION PROFILE (hypoglycemic effect)

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>ONSET</th>
<th>PEAK</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subq</td>
<td>3–4 hr</td>
<td>3–14 hr†</td>
<td>6–24 hr‡</td>
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†Small amounts of insulin detemir are slowly released resulting in a relatively constant effect over time.  
‡Duration is dose dependent; duration increases as dose increases.

### Contraindications/Precautions
Contraindicated in: Hypoglycemia; Allergy or hypersensitivity to a particular type of insulin, preservatives, or other additives.  
Use Cautiously in: Stress and infection may temporarily alter insulin requirements; Renal/hepatic impairment (may alter insulin requirements); Concurrent use with pioglitazone or rosiglitazone (risk of fluid retention and worsening HF); OB: Pregnancy may temporarily alter insulin requirements; Pedi: Children <2 yr (safety not established).

### Adverse Reactions/Side Effects
**Endo:** Hypoglycemia.  
**Local:** Lipodystrophy, pruritis, erythema, swelling.  
**Misc:** Allergic reactions including anaphylaxis.

### Interactions
**Drug-Drug:** Beta blockers, clonidine, and reserpine may mask some of the signs and symptoms of hypoglycemia. Corticosteroids, thyroid supplements, estrogen, minoxidil, phenothiazines, and vitamin E may alter insulin requirements. Alcohol, ACE inhibitors, MAO inhibitors, estrogens, oral hypoglycemic agents, and salicylates may alter insulin requirements. Concurrent use with pioglitazone or rosiglitazone may alter fluid retention and worsening HF.  
**Drug-Natural Products:** Glucosamine may worsen blood glucose control. Fenugreek, chromium, and coenzyme Q-10 may produce additive hypoglycemic effects.

### Route/Dosage
Dose depends on blood glucose, response, and many other factors.

**Subcut (Adults and Children ≥2 yr):**  
Type 2 diabetes patients who are insulin-naive—0.1–0.2 units/kg once daily in the evening (or divided into a twice daily regimen) or 10 units once daily in the evening (or divided into a twice daily regimen).  
Patients with type 1 or 2 diabetes receiving basal insulin—may substitute on an equivalent unit-per-unit basis.

### Nursing Implications
**Assessment**  
Screen patient for signs and symptoms of hypoglycemia (anxiety, restlessness, tingly in hands, feet, lips, or tongue; cold sweats; confusion, agitation; flushed, dry skin; fruity breath odor; headache; irritability; nervousness; tremor; weakness; unsteady gait) periodically during therapy.  
Monitor body weight periodically. Changes in weight may necessitate changes in insulin dose.

**Nursing Considerations**

- **All** = Greater Implication  
- **Ο** = Cautious use  
- **Ο** = Generic Implication  
- **Ο** = Significant use  
- **Ο** = Uncommon use  
- **Ο** = Discontinued

- **Contraindicated use:** Hypoglycemia, akathisia, or hyperkalemia in a particular type of insulin, preservatives, or other additives.

- **Use cautiously in:** Stress and infection may temporarily alter insulin requirements; Renal/hepatic impairment (may alter insulin requirements); Concurrent use with pioglitazone or rosiglitazone (risk of fluid retention and worsening HF); OB: Pregnancy may temporarily alter insulin requirements; Pedi: Children <2 yr (safety not established).
**Lab Test Considerations:** Monitor blood glucose every 6 hrs during therapy, more frequently in ketotic or stressed states. Monitor ketones in ketotic states. Monitor blood glucose before and 1 hr after meals and at bedtime.

**Dose and Dosage Forms:** Available as suspension in vials or prefilled syringes. Not for IV administration or use with insulin pumps.

**Potential Nursing Diagnoses**

- **Noncompliance (Patient/Family Teaching)**
  - **Implementation**
    - **High Alert:** Insulin-related medication errors have resulted in patient harm and death. Clarify ambiguous orders; do not accept orders using the abbreviation “u” for units (can be mistaken as zero or the numeral 4). Insulins are available in different types, strengths (e.g., U100), and expiration dates. Do not intermix insulins without consulting a pharmacist.
    - Do not confuse Levemir (insulin detemir) with Lovenox (enoxaparin).
    - Use only insulin syringes to draw up dose. The unit markings on the insulin syringe must match the insulin’s units/mL. Special syringes for 50 units are available. Before withdrawing dose, rotate vial between palms to ensure uniform solution; do not shake.
    - Do not mix insulin detemir with any other insulin or solution, or use syringes containing any other medication or residues. Do not give insulin detemir with a short acting insulin. Solution should be clear and colorless with no particulate matter.
    - Do not use if cloudy, discolored, or unusually viscous. Store unopened vials and cartridges of insulin detemir in the refrigerator; do not freeze. After initial use, vials of insulin detemir cartridges (PenFill) or a prefilled syringe may be stored in a cool place for 42 days. Do not store in-use cartridges and prefilled syringes in refrigeration or with a needle in place. Keep away from direct heat and sunlight.
    - **Subcut:** Rotate injection sites.
    - **Administer:** Daily insulin detemir evening dose, at bedtime, or 12 hrs after evening meal.
    - **Not for IV administration or use with insulin pumps.

**Patient/Family Teaching**

- **Instruct patient on proper technique for administration.** Include type of insulin, equipment (e.g., pen needles, alcohol swabs), storage, and place to discard syringes. Discuss the importance of not changing brands of insulin or syringes, selection and rotation of injection sites, and compliance with therapeutic regimen. Patients taking insulin detemir should be given the Patient Information Circular for this product.
- **Instruct patient to perform daily screening of serum glucose and ketones.** These tests should be closely monitored during periods of stress or illness and health care professional notified of significant changes.
- **Emphasize the importance of compliance with nutritional guidelines and regular exercise as directed by health care professional.**
- **Instruct patient to notify health care professional of all Rx or OTC medications, vitamins, or herbal products being taken and to consult health care professional before taking other Rx, OTC, herbal products, or alcohol.
- **Advise patient to notify health care professional of medication regimen prior to treatment or surgery.**
- **Advise patient to notify health care professional if nausea, vomiting, or fever develops.** If unable to take regular diet, oral blood glucose levels are not controlled.
- **Instruct patient to report symptoms of hypoglycemia and hyperglycemia and what to do if they occur.**
- **Patients with diabetes mellitus should carry a source of sugar (candy, glucose gel) and identification describing their disease and treatment regimen at all times.**
- **Advise patient to seek health care professional if pregnancy is planned or suspected or if breast feeding or planning to breast feed.**
- **Emphasize the importance of regular follow-up, especially during first few weeks of therapy.**

**Evaluation/Desired Outcomes**

- Control of blood glucose levels in diabetic patients without the appearance of hypoglycemic or hyperglycemic episodes.

**Why was this drug prescribed for your patient?**

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