معهد دسمان للسكري
Dasman Diabetes Institute
KFAS
أحد مراكز
Center

HOMA TEST IN DIABETES

The HOMA test (Homeostasis Model Assessment) is a laboratory method used to assess insulin resistance by measuring fasting blood glucose and fasting insulin. Insulin resistance is a condition where the body's cells do not respond well to insulin, leading to higher blood sugar levels. It is a major factor in the development of type 2 diabetes mellitus (DM2) and other metabolic disorders.

HOMA-IR is widely used because it is simple, cost-effective, and requires only one fasting blood sample. It gives an estimate of how much insulin the body needs to keep blood glucose in the normal range. Higher HOMA-IR values indicate greater insulin resistance.

When is the HOMA Test Ordered:

The HOMA test may be ordered when individuals:

- Have family history of diabetes
- Have polycystic ovary syndrome (PCOS)
- Have non-alcoholic fatty liver disease (NAFLD) risk factors
- Have impaired fasting glucose or pre-diabetes
- Are monitored for insulin resistance during lifestyle or clinical treatments

Why is the HOMA Test Important:

- Helps detect insulin resistance early
- Assists in evaluating risk for type 2 diabetes
- Useful in monitoring response to lifestyle changes or therapies
- Adds information beyond glucose alone, since insulin may rise before glucose does

How is the HOMA Test Calculated:

HOMA-IR is calculated from fasting measurements:

$$\text{HOMA-IR} = (\text{Fasting Insulin} \times \text{Fasting Glucose}) / 22.5$$

Fasting glucose in mmol/L and fasting insulin in mU/L are required for calculation

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SPECIMEN:

- Specimen Type: Blood (Serum or Plasma)
- Tube: Plain Tube or Lithium Heparin Tube

PATIENT PREPARATION:

- Fast for 8–14 hours before sample collection (water allowed)
- Avoid heavy exercise before testing
- Inform the laboratory about medications taken, especially those affecting glucose or insulin

NORMAL RANGES AND INTERPRETATION:

HOMA-IR Value	Interpretation
< 1.0	Optimal insulin sensitivity (normal)
1.0 – 1.9	Normal to mild insulin resistance
2.0 – 2.5	Early insulin resistance
≥ 2.5	Insulin resistance likely present
≥ 4.0	Significant insulin resistance

TURNAROUND TIME (TAT):

- 7 Days

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References:

- Reference intervals and assay specific considerations (2021) — Distribution of HOMA IR reference intervals in a large population cohort (Gutenberg Health Study).
- ADA Standards of Medical Care in Diabetes (latest year available, e.g., 2025) — Official clinical practice guidelines for diabetes diagnosis and management, including insulin resistance and related testing guidelines.

Prepared By: May Sewify

Reviewed By: Asma Al Hubail, Head of Unit – Clinical Laboratory

Approved by:

Dr. Ahmed Al Sarraf

Senior Head of Unit – Clinical Laboratory

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