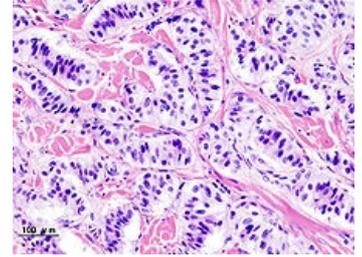


# Neuroendocrine tumors of the pancreas

**Neuroendocrine tumors of the pancreas** include **insulinoma, gastrinoma, glucagonoma, somatostatinoma, VIPoma**. Collectively, tumors derived from the cells of the Islets of Langerhans are referred to as **nesidiomas**.

## Insulinoma

Insulinoma is, in most cases, **benign** tumor (adenoma) derived from insulin producing  **$\beta$ -cells** of the Islets of Langerhans. The most common localization is the head and body of the pancreas. The malignant variant (nesidioblastoma) occurs in only about 5-10% of cases. Women are more often affected, it occurs between the ages of 20 and 75. It is the most common of all neuroendocrine tumors of the pancreas.



Pancreatic insulinoma

## Clinical picture

The classic manifestation is morning hypoglycemia due to excessive insulin production, manifested mainly on an empty stomach. The most manifested are neuroglycopenic symptoms - headaches, diplopia and impaired vision, behavioral changes, decreased concentration, speech and consciousness disorders. Sympathoadrenal axis activation is less common (sweating, palpitations, tachycardia).

## Diagnostics

The most important criterion is the patient's clinical condition (see above). A typical **Whipple triad** is described for insulinomas:

1. laboratory confirmed hypoglycemia ( $\leq 2.5$  mmol),
2. presence of symptoms of hypoglycaemia,
3. adjustment of the condition after serving sweet food (glucose).

## Gastrinoma

 For more information see *Gastrinoma*.

## Glucagonoma

Tumor arising from **A-cells** of the pancreas. It is relatively rare but often **malignant** and metastasizing. Clinical picture:

- necrolytic migrating erythema,
- increased catabolism,
- elevated blood glucose,
- dyslipidemia,
- cholelithiasis, steatorrhea.

## Somatostatinoma

Very rare **malignant** with early liver metastasis. Clinical picture:

- dyspepsia,
- diarrhea,
- weight loss,
- abdominal pain, cholelithiasis, steatorrhea,
- anemia.

## VIPoma

Rare tumor producing vasoactive intestinal peptide. Clinical picture:

- watery diarrhea, hypokalaemia, acidosis.