

# Glucagon-like-peptide 1 Receptor imaging specifically localizes insulinomas in patients with Multiple Endocrine Neoplasia Type 1 (MEN-1)

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## Background

- Surgery is often the only treatment option that can effectively treat patients with insulinomas in MEN-1.
- The surgical intervention should be limited as surgery can not cure patients with MEN-1.
- It is mandatory to correctly localize insulin secreting tumors from other neuroendocrine tumors.
- Benign insulinomas express Glucagon-Like Peptide-1 Receptor (GLP-1R) in nearly 100% of the cases and at a high density.
- Targeted GLP-1R imaging has been shown to be a valid and non-invasive tool to localize these small tumors.
- It is unknown, whether GLP-1 R imaging is useful in the context of MEN-1.

## Aim

We aimed at assessing the utility of GLP-1 receptor (GLP-1R) imaging in the identification of insulinomas from other pancreatic lesions in the context of MEN-1.

## Methods

6 patients with proven endogenous hyperinsulinemic hypoglycemia and neuroglycopenia in the context of MEN-1 were included.

All patients received abdominal SPECT/CT after the injection of a standard activity of <sup>111</sup>In-DOTA-exendin-4.

Four patients underwent additional imaging with a standardized contrast media enhanced 3T MRI and a <sup>68</sup>Ga-DOTA-exendin-4 PET/CT scan as part of the study. Standard of comparison was the histological diagnosis after surgery.

## Results

- Six patients (4 females and 2 males) were included (age range 18-49 years).
- Until today 5 of 6 patients have been operated.
- Conventional imaging revealed a total of 11 suspicious pancreatic or peripancreatic lesions.
- PET/CT and SPECT/CT imaging together revealed 6 lesions with a high expression of Glucagon-like Peptide-1 receptors (GLP-1R) suspicious for an insulinoma.
- Based on the GLP-1R imaging all 6 lesion were surgically removed, histopathology confirmed the diagnosis of a benign insulinoma and all 5 patients presented with normalized blood sugar levels after surgery.

## Conclusion

In MEN-1 patients, insulin secreting pancreatic NET express GLP-1R in a high incidence and density.

Adding GLP-1R imaging to conventional imaging is a helpful tool in differentiating insulinomas from other pancreatic islet tumors expressed in MEN-1 patient and may guide the surgical intervention.

Figures: Ce 3T MRI, <sup>111</sup>In-Octreoscan SPECT/CT and <sup>68</sup>Ga-DOTA-exendin-4 PET/CT in one patient with MEN-1

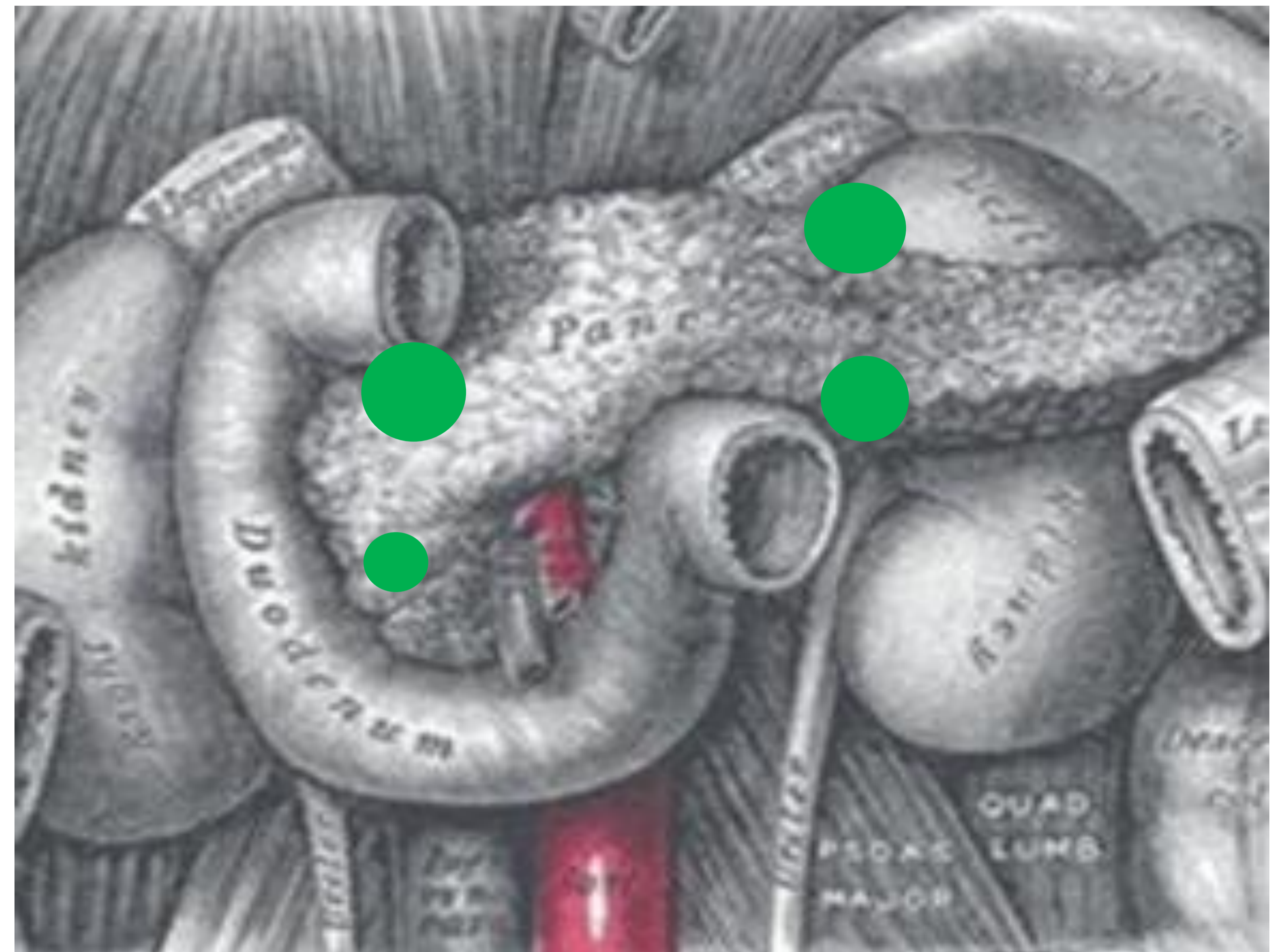


Figure 1: 3T MRI revealed 4 lesions in the pancreas. Differentiation between insulinomas and other neuroendocrine tumors is not possible with MRI

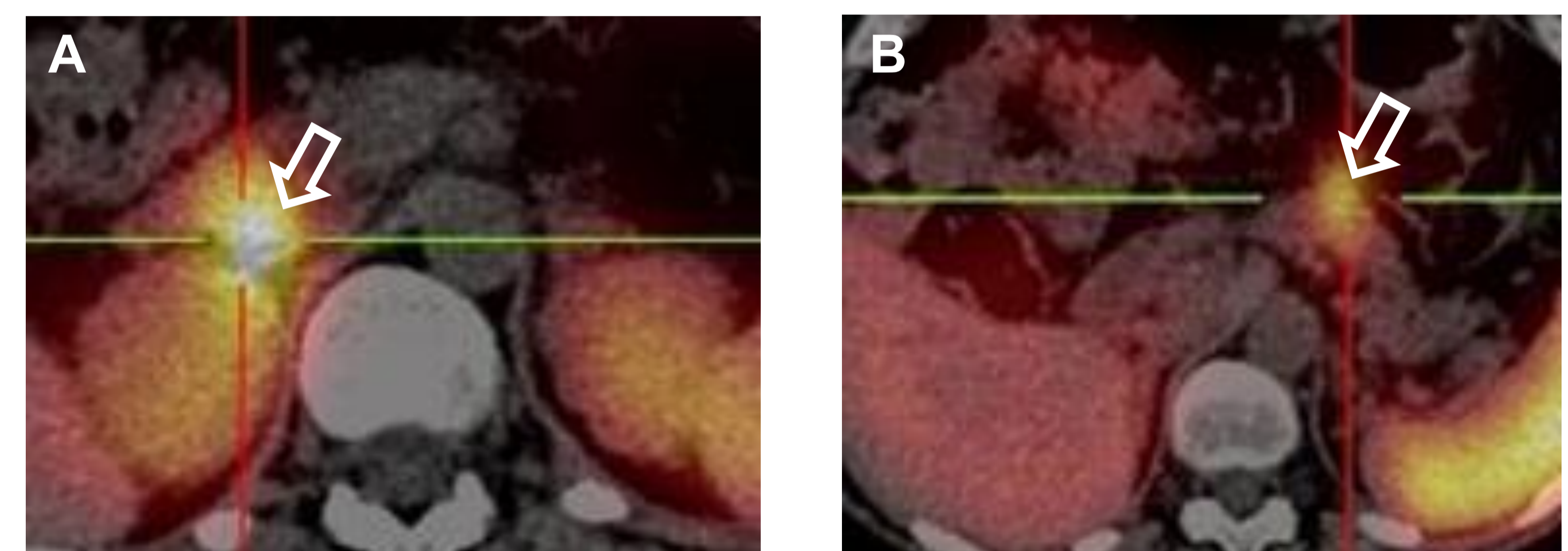


Figure 2: <sup>111</sup>In-Octreoscan SPECT/CT shows a lesion with somatostatin receptor (SSTR) expression in the cranial portion of the pancreatic head (A) and another SSTR positive lesion in the ventral portion of the pancreatic tail (B). Histopathology: (A) Gastrinoma (B) Ppoma

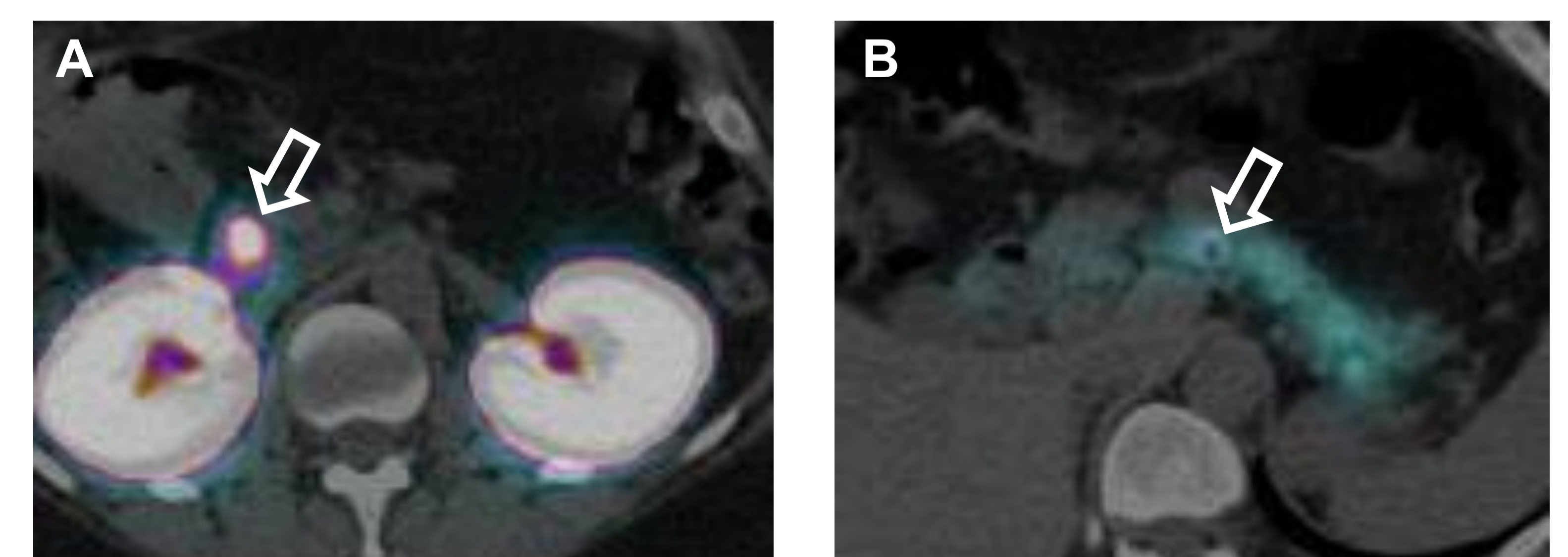


Figure 3: <sup>68</sup>Ga-DOTA exendin-4 PET/CT shows a lesion with strong GLP-1R expression in the uncinus process (A) and an another GLP-1R positive lesion in the dorsal portion of the pancreatic tail (B). Histopathology: (A) Insulinoma (B) Insulinoma