



# Pancreatic cancer and nutritional implications

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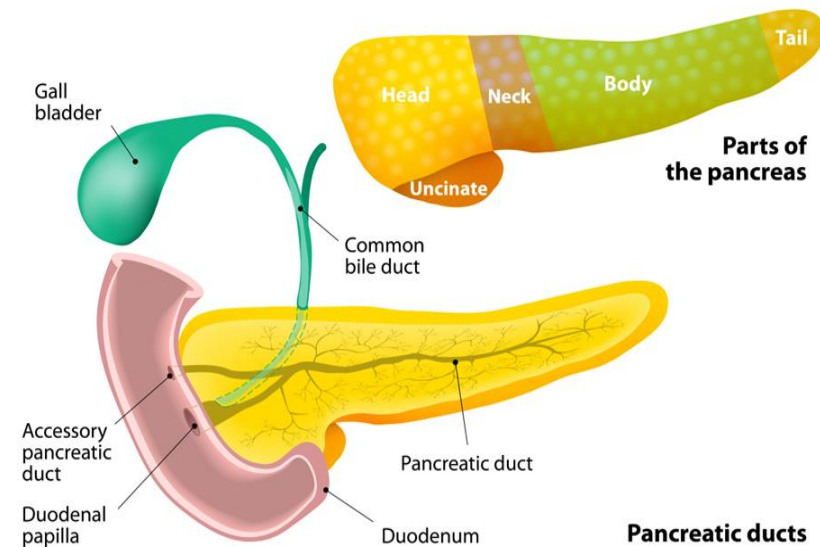
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# Pancreatic function

- ▶ **Exocrine:** production of digestive enzymes (lipase, amylase, proteases) and sodium bicarbonate.
- ▶ **Endocrine:** production of hormones including insulin and glucagon.

## ANATOMY OF THE PANCREAS



# Pancreatic cancer and weight loss

**72% of people with pancreatic cancer had unintentional weight loss within a year of diagnosis (Hue et al, 2020).**

- ▶ **Maldigestion** caused by blocked pancreatic ducts.
- ▶ **New onset diabetes** relating to pancreatic cancer.
- ▶ **Poor appetite** is driven by pancreatic cancer metabolites and symptoms.
- ▶ **Increased nutritional requirements** – 10% rise in energy expenditure due to tumour metabolism.



## Pancreatic Enzyme Insufficiency (PEI)

- ▶ Pancreatic cancer causes PEI due to the tumour blocking the main pancreatic duct and growing within the pancreatic tissue.
- ▶ Occurs in up to 46 – 100% of cases (Bartel, 2015).
- ▶ Faecal Elastase-1 test is not generally necessary.

### **Digestive symptoms of PEI (steatorrhoea)**

- ▶ Wind, bloating abdominal discomfort/pain, reflux and burping.
- ▶ Greasy, oily floating stool
- ▶ Loose/diarrhoea opening bowels several times per day
- ▶ Paler, yellow or orange in colour
- ▶ Urgency
- ▶ Bulky stool and difficult to flush
- ▶ Offensive smell
- ▶ Note\* impact of constipation medication/pain relief



## Pancreatic enzyme replacement therapy (PERT) for maldigestion caused by pancreatic enzyme insufficiency

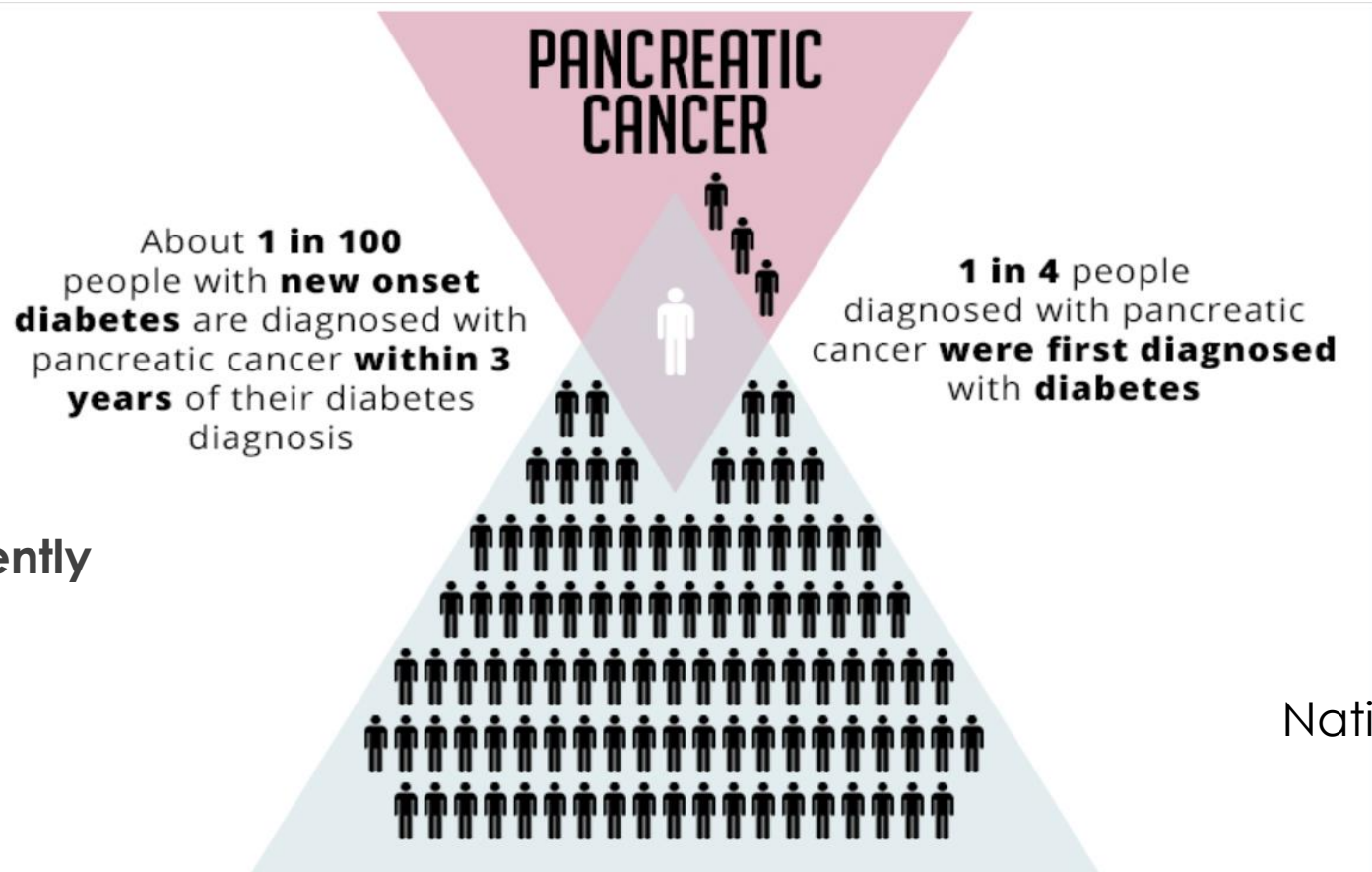
- ▶ **Nice 2018 recommends that all people with unresectable pancreatic cancer should be offered pancreatic enzyme replacement therapy (PERT).**
- ▶ Brands – Creon, Nutrizyme 22, Pancrex
- ▶ Enzymes sourced from the pancreas of pigs
- ▶ **Starting doses** 44 000 – 75 000 with **meals** and 22 000 – 50 000 units lipase with **snacks** and **nutritious fluids**. (Phillips et al, 2021).
- ▶ Dose adjust - depending on the nutritional content of the meal or snack
- ▶ Timing – with food and nutritious fluids
- ▶ Foods and drinks which don't require PERT
- ▶ Right time, right place and right ph
- ▶ Temperature sensitive

## Benefits of taking pancreatic enzyme replacement therapy

- ▶ Symptom improvement
- ▶ Reduces weight loss
- ▶ Improves tolerance to treatment
- ▶ Improves survival time
- ▶ QOL



## Diabetes relating to pancreatic cancer (type 3c)



Type 3c is frequently misdiagnosed

National Cancer Institute

# Diabetes relating to pancreatic cancer

## Type 3c

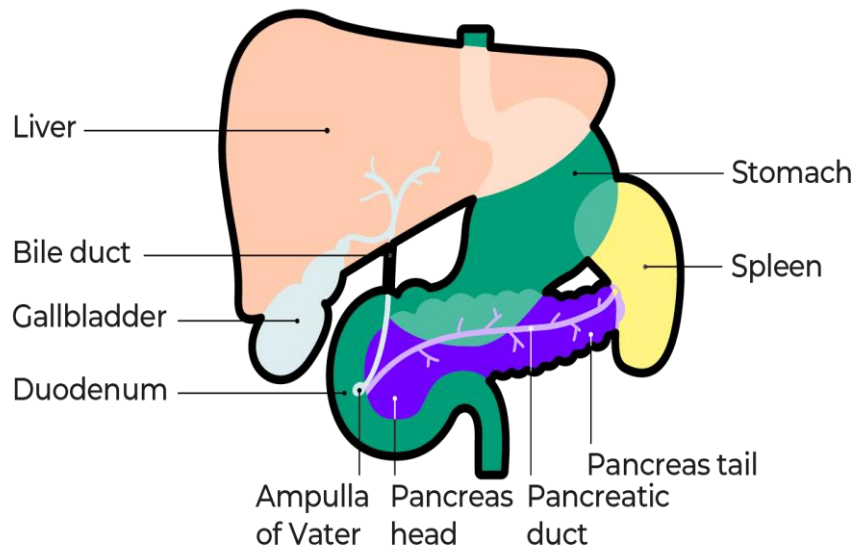
### Symptoms of diabetes:

- ▶ Thirst
- ▶ Tiredness
- ▶ Weight loss
- ▶ Nocturia/polyurea
- ▶ Craving sugary drinks and foods
- ▶ Blurred vision
- ▶ Delayed wound healing
- ▶ Infections

	Pathophysiology	Medication	Diet
<b>Type 1</b>	Autoimmune destruction of beta cells	Insulin at diagnosis	Healthy eating
<b>Type 2</b>	Metabolic syndrome	Hypoglycaemic agents oral/injection Insulin at later stage	Healthy eating aiming for weight management
<b>Type 3c</b>	Tumour metabolites cause insulin resistance and reduced insulin production due to beta cell dysfunction	Metformin Sulfonylureas Insulin	Nutritional support Weight gain if appropriate



# Loss of appetite causing reduced oral intake and weight loss



- ▶ Pain
- ▶ Nausea
- ▶ Vomiting
- ▶ Feeling full quickly
- ▶ Anxiety and depression
- ▶ Taste changes and loss of taste
- ▶ Constipation
- ▶ Diarrhoea/Steatorrhoea/PEI
- ▶ Side effects of treatment
- ▶ Severe loss of appetite

“Food has become a source of stress and upset; at times this has put a strain on our relationship”



## Nutritional support to help with preventing weight loss and initiating weight gain

- ▶ Dietary preferences
- ▶ Little and often meal pattern
- ▶ High protein and high kcal food choices
- ▶ Nutritious liquids
- ▶ Prescribed oral nutritional supplements
- ▶ Softer foods
- ▶ Taste changes
- ▶ Mindless eating
- ▶ Healthier high-calorie and protein choices
- ▶ Food preparation and external support
- ▶ Involve carers

## Dietary advice for people with type 3c diabetes

- ▶ **Reframe** nutritional goals if misdiagnosed – nutritional support whilst managing glycaemic control
- ▶ Specialist diabetes assessment for the initiation of oral hyperglycaemia agents and/or insulin
- ▶ Limit simple sugar-containing foods and drinks
- ▶ Include nutritious foods which include protein, fat, carbohydrates
- ▶ **Monitor** blood glucose control across their treatment pathway (diagnosis, preoperative, postoperative, during chemo/radiotherapy, course of steroids, during palliative/best supportive care, end of life with discussion).

## Example meal plan for pancreatic exocrine insufficiency, 3c diabetes and a poor appetite

- ▶ **Breakfast** - Porridge made with all milk (full fat or semi skimmed)
- ▶ **Snack** – Greek yogurt with a handful of berries or slices of banana
- ▶ **Lunch** – Lentil and tomato soup sprinkled with grated cheese and served with bread and butter – torn into crouton-size pieces on top of soup at serving
- ▶ **Snack** – Crackers and cream cheese
- ▶ **Evening meal** – Small portion of lasagne
- ▶ **Snack** – a piece of cake served with ice cream
  
- ▶ **Drinks** – milky coffee, hot chocolate or malt drink made with all milk, glass of milk, oral nutritional supplements – milky, yogurt, savoury style

## Contributing factors to consider

- ▶ Mouth care
- ▶ Anti emetics
- ▶ Timing of analgesia
- ▶ Constipating effect of analgesia
- ▶ Co-existing health conditions – heart disease - cholesterol, type 2 diabetes, allergy/intolerance, weight management



## Case study

- ▶ 72-year-old lady diagnosed with a tumour in the head of the pancreas
- ▶ Seen in surgical/oncology pancreatic outpatients
- ▶ Presenting symptoms: tiredness, weight loss, change in bowel habits
- ▶ Loss of appetite
- ▶ Random blood glucose: 22mmol/l (diagnostic random: 11.1mmol/l)
- ▶ Referred for oncology assessment
- ▶ Started on Creon 25 000 and gliclazide by oncologist
- ▶ Food-first nutritional support advice
- ▶ 2-week review