

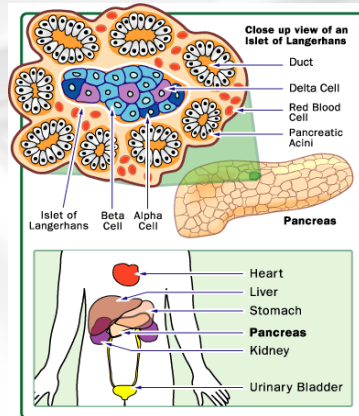
# Nutritional Challenges Unique to Pancreatic Cancer

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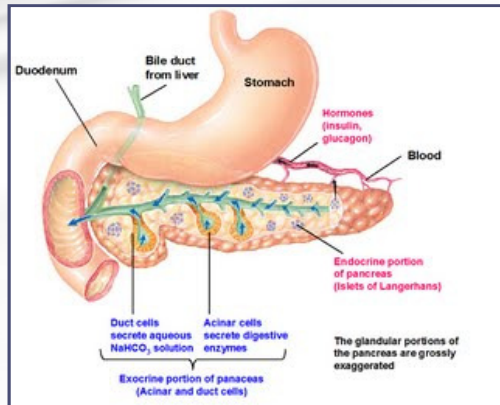


## Pancreas

### Endocrine Function



### Exocrine Function



Google image, accessed 8/14/2014

## Upon Diagnosis: Potential Nutrition Issues

- Loss of appetite
- Taste changes
- Pain associated with eating
- Fatigue
- Weight loss
- Altered GI function (excess gas, abdominal cramping, loose stools or constipation)
- Vitamin deficiencies
- Elevated blood sugar levels

American Cancer Society; accessed 8/14/2014; National Institutes of Health: Pancreatic Care Information; accessed 8/14/2014.



## Common Symptom: Loss of Appetite

- Meal planning with goal of 5-6 small meals a day
- Bigger plate, smaller portions
- Take anti-nausea medications preventively
- Limit high fat, overly fragrant foods
- Room temperature or cold foods work well
- Appetite stimulants
- Drink your calories: supplement drink choices



## Types of Supplements

- Boost
- Ensure
- Scandi Shake
- Carnation Breakfast Essentials
- Myoplex
- Muscle Milk
- Bolt House Farms
- Orgain
- Ensure Clear
- Resource Breeze
- Glucerna
- Boost DM
- Smoothies
- Protein Bars

## Common Symptom: Taste Changes

- May be induced by: medications, chemotherapy or radiation
- Good oral hygiene
- Salt water rinses
- Use bold flavors
- Avoid metal utensils and aluminum cans
- Avoidance of offending foods
- Be open to try other foods
- Role of zinc supplements

## Common Symptoms: Pain & Fatigue

### Pain & Fatigue associated with Eating

- Be proactive with pain medications
- Biggest meal in the morning
- Small meals and snacks
- Eat slowly and chew well!
- Shakes & Supplements
- Use of exercise



## Common Symptom: Weight Loss

- **Tumor Induced weight loss:**
  - Appetite suppression
  - Altered metabolism
  - Pancreatic exocrine insufficiency
  - Uncontrolled DM
  - Use of Medium Chained Triglycerides (MCT), Eicosapentaenoic acid (EPA)

Tisdale, M. (1991) *Cancer Cachexia*. Br J Cancer. 1991 March; 63(3): 337-342.; Fearon, C. et al (2006) *Definition of cancer cachexia: effect of weight loss, reduced food intake, and systemic inflammation on functional status and prognosis*. Am J Clin Nut Vol. 83, No. 6, 1345-1350



## Common Symptom: Bowel Pattern Changes



Google image: accessed 3/21/11

Versus



## Constipation Causes and Solutions

- Causes:
  - Pain medications
  - Chemotherapy
  - Limiting fiber in diet
  - Pancreatic enzymes
- Symptom Management:
  - Increase fiber rich foods
  - Hydration
  - Limit binding foods
  - Add dairy
  - Use stool softeners/laxatives as prescribed

## Common Symptoms: Loose Stools

- Loose stools may be caused by:
  - Exocrine Insufficiency/Malabsorption: color, consistency, odor
  - Chemotherapy changes
  - Radiation changes
  - Lactose intolerance
  - Bacterial overgrowth
    - Role of Fructooligosaccharides
    - Role of Probiotics

Bustillo, I. (2009). *Small intestine bacterial overgrowth*: 10 (5): 576-8.



## How to Manage Loose Stools

- Limit high fat foods
- Limit insoluble fiber
- Limit simple sugars
- Limit sugar alcohols
- Limit Dairy
- Use of anti-diarrheal medications
- Use of pancreatic enzymes



[www.cancercare.org/pdf/booklets/ccc\\_pancreatic.pdf](http://www.cancercare.org/pdf/booklets/ccc_pancreatic.pdf): accessed 9/20/2014.

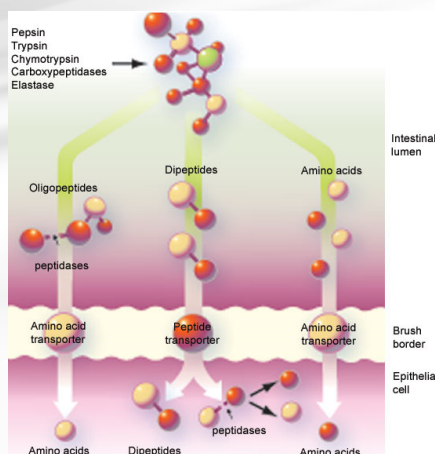
## So, What Can You Eat?

- Eat more soluble fiber rich foods: bananas, oats, applesauce
- Eat more binding type of foods: cheese, rice, bananas
- Hydrate properly: water, electrolyte drinks
- Probiotics: tempeh, kefir, yogurt, OTC/prescription brands

## Common Symptom: Exocrine Insufficiency

### •Symptoms of Pancreatic Insufficiency:

- Indigestion
- Cramping after meals
- Large amounts of gas
- Loose stools
- Change in smell of gas and stools
- Floating or greasy stools
- Increased frequency of stools





## Who Needs Pancreatic Enzymes?

- Tumors in the pancreas
- Following pancreatic surgery
  - Whipple Procedure
  - Total Pancreatectomy
- Obstruction of pancreatic or biliary duct
- Duodenal tumors



## Pancreatic Enzymes

- Newer FDA regulations
- Common Brands:
  - Creon ®
  - Zenpep ®
  - Pertzyme ®
  - PanCreaze ®
  - Viokase ®
- Tips for success:
  - Divide doses throughout meal times
  - Do not crush or chew
  - Do not take with dairy rich foods
  - Do not take with iron supplement
  - Take acid reducer medication



<http://www.medicaid.nv.gov/Downloads/provider/Pancreatic%20Enzymes.pdf> accessed 9/20/14



## Pancreatic Enzymes (continued)

- How much do you need?
  - Individualize
  - Trial of different products
  - Calculate amount per meal and snack
    - Meals: 20,000-40,000 units of lipase per meal
    - Snacks: 10,000-20,000 units of lipase per meal
    - Increase as needed
    - May need to use combination of pancreatic enzymes
- What if you take too many?
  - Constipation (not to be confused with narcotic induced constipation)
  - Abdominal cramping
  - Nausea
- If you experience these symptoms talk to your healthcare team.



## Elevated Glucose

- Prevalence of diabetes
- Relationship between diabetes and the diagnosis of pancreatic cancer
- Onset of diabetes in pancreatic cancer may be up to 18-24 months before diagnoses of cancer
- New onset hyperglycemia
- Hyperglycemia in previously well-controlled diabetes
- Progressively worsening diabetes control, despite increasing therapy
- Steroid induced during therapy

Hidalgo, M. (2010). *Medical progress: Pancreatic cancer*. New England Journal of Medicine 362:1605-1617.

Pannala, R et al (2008). *Prevalence and clinical profile of pancreatic cancer-associated diabetes mellitus*. Gastroenterology 134: 981-987



## Types of Diabetes

| Type 1                                       | Type 2  | Gestational  | Other  |
|--|---|--|--|
| Autoimmune beta cell destruction of pancreas | Insulin resistance<br>Relative insulin deficiency | Diabetes diagnosed during pregnancy and resolves after pregnancy | <ul style="list-style-type: none"> <li>•Genetic defects in beta cell function</li> <li>•Pancreatic insufficiency               <ul style="list-style-type: none"> <li>➢Cystic Fibrosis</li> <li>➢Pancreatitis</li> <li>➢Pancreatic Cancer</li> </ul> </li> </ul> |
|  |   |  |  |

Diabetes Care, volume 32, supplement 1, January 2011



## Glucose Goals

|                                   |              |
|-----------------------------------|--------------|
| A1c (glycohemoglobin)             | <7%          |
| Preprandial (pre-meal)            | 70-130 mg/dL |
| 1-2 hour postprandial (post-meal) | <180 mg/dL   |

Goals should be individualized

Diabetes Care, volume 32, supplement 1, January 2011



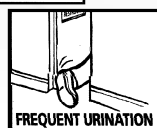
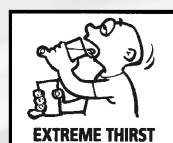
## Correlation of A1c with Average Glucose

| A1c (%) | mg/dl |
|---------|-------|
| 6       | 126   |
| 7       | 154   |
| 8       | 183   |
| 9       | 212   |
| 10      | 240   |
| 11      | 269   |
| 12      | 298   |

Diabetes Care, volume 32, supplement 1, January 2011



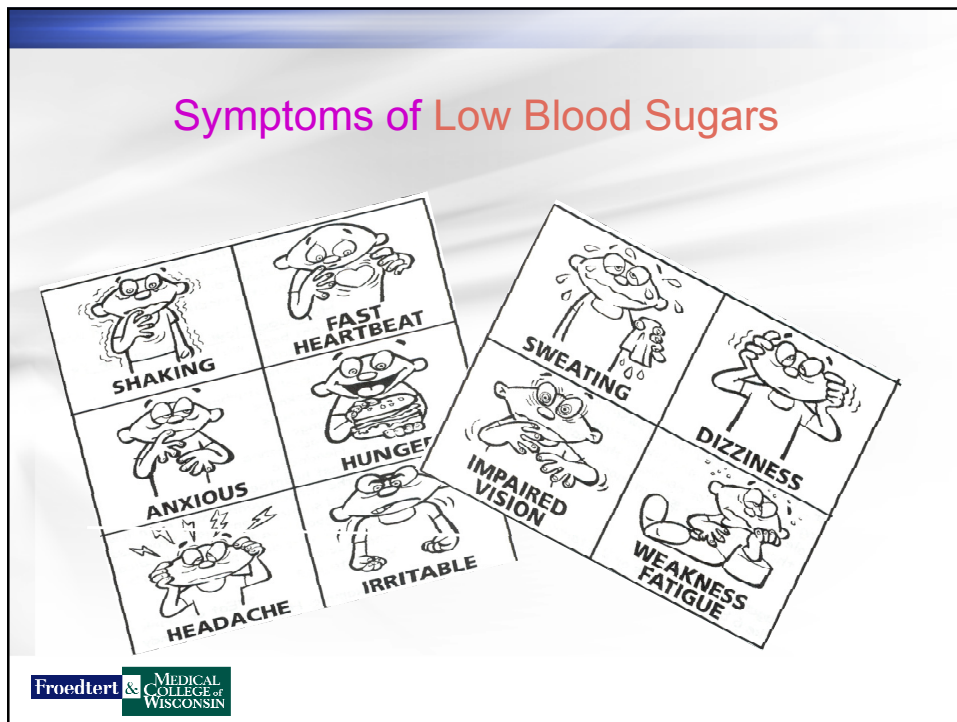
## Short term complications



**Prolonged  
hyperglycemia**  
Can result in  
*WEIGHT LOSS*  
and  
*DEHYDRATION*

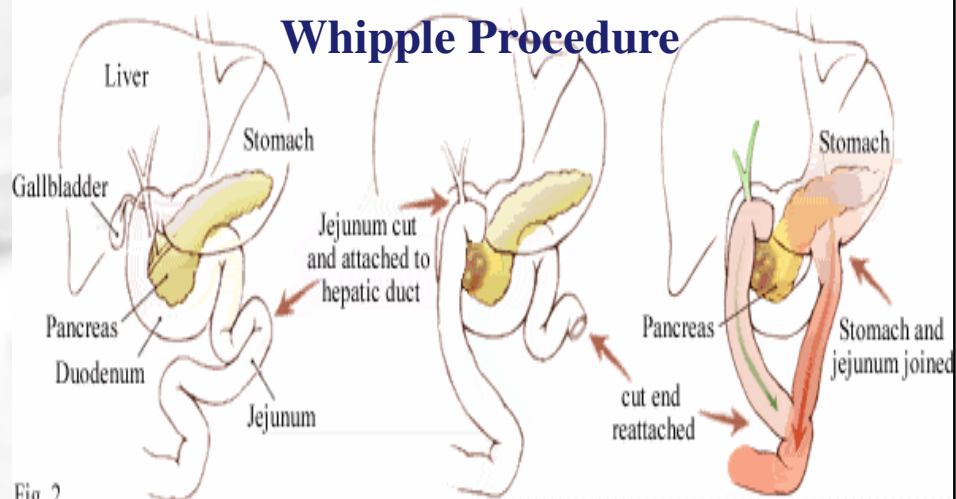


## Symptoms of Low Blood Sugars



## Nutrition After Surgery

### Whipple Procedure



## Post-op Nutrition Considerations

- May be on tube feeding
- Diet advance from Clear Liquid to low fat, low fiber, low lactose
- Hydration
- Diabetes Management
  - Feeding tube-may need insulin
  - As diet advances, may need insulin
  - 50% diabetes resolves after surgery
- Blood sugars dictate if treatment necessary

## Other Considerations

- Supplement B12 and iron as needed
- Adjust pancreatic enzymes
- Supplement Fat Soluble Vitamins
- Monitor Weight
- Monitor Blood Sugars
- Survivorship

## Summary

- Proper nutrition is essential to success!
- Prevent weight loss (unless recommended by your MD).
- Manage side effects each step of the way through treatment, including blood sugar management, pancreatic insufficiency and necessary diet modifications.



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## Questions & Thank You!

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