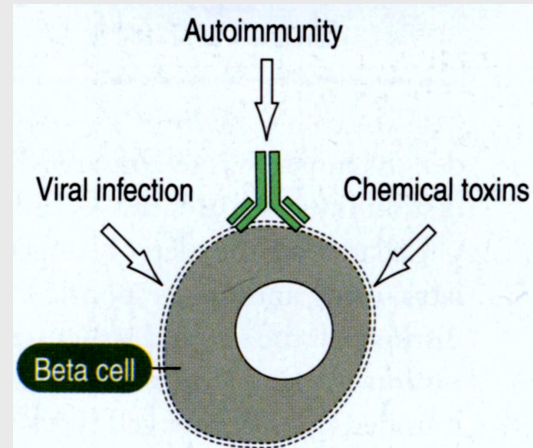


TE Pancreas

Diabete mellito

- Tipo 1: insulina-dipendente
- Tipo 2: insulina-indipendente

Tipo 1



Lack of insulin because of a destruction of beta cells

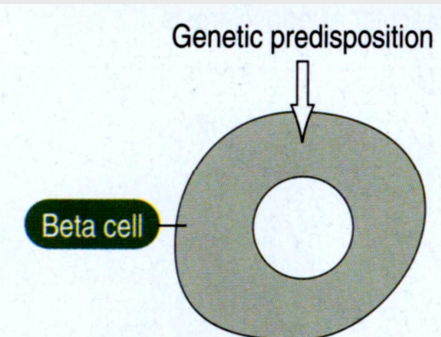
Individuals with type 1 require exogenous insulin to maintain life because there is no pancreatic insulin production.

Beta cells are damaged by the action of cytokines and autoantibodies produced by inflammatory cells.

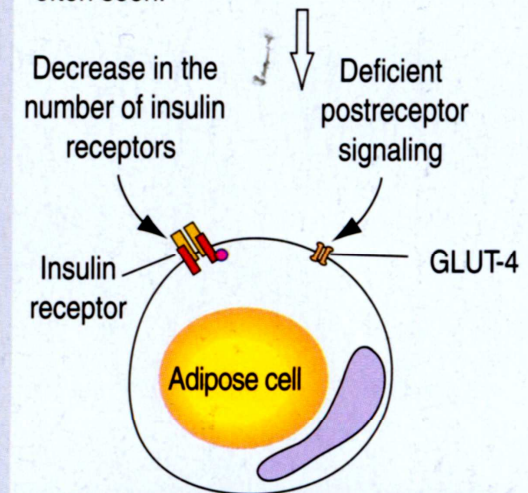
Patients with type 1 are susceptible to ketosis.

Although 90% of the cases of type 1 begin in childhood (juvenile diabetes), it can develop at any time of life.

Tipo 2

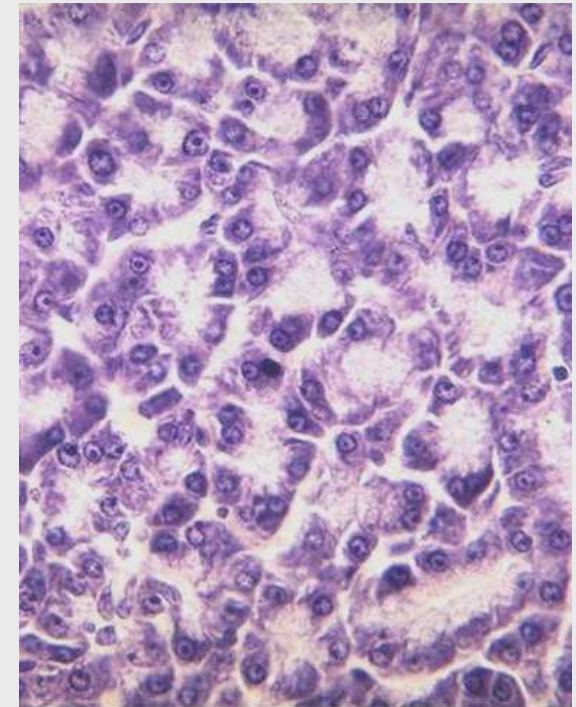
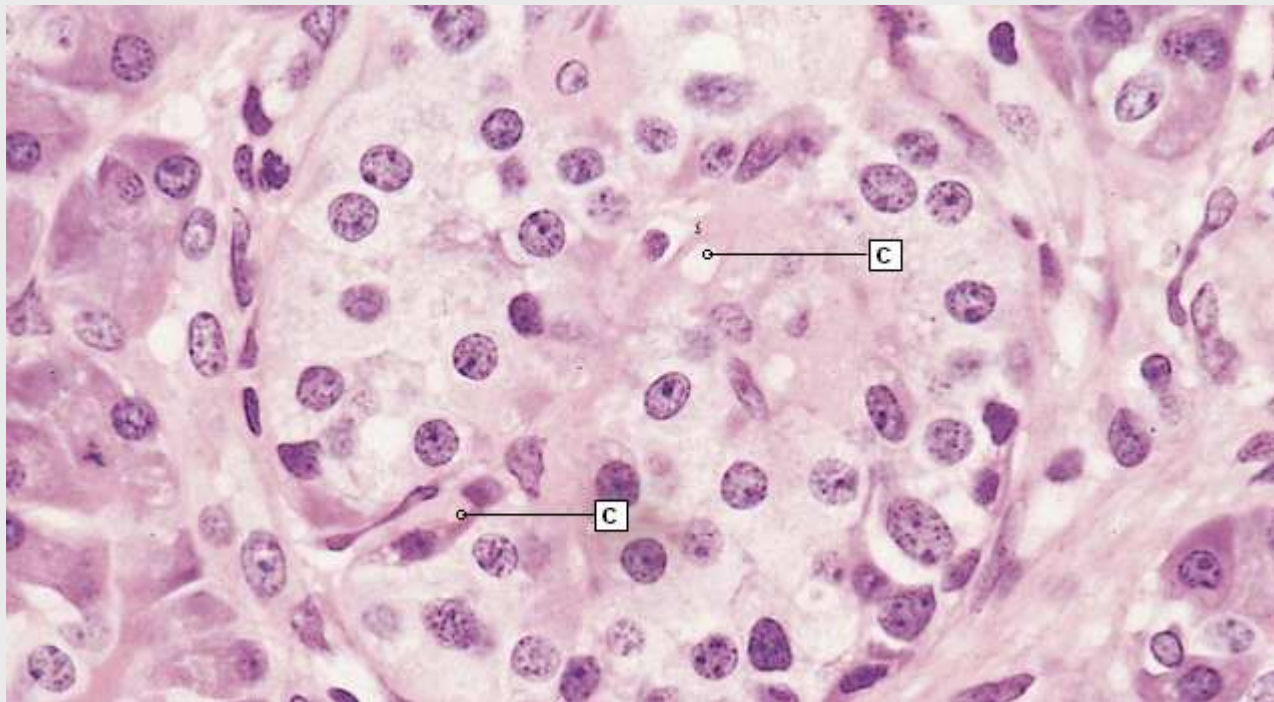


Insufficient insulin secretion relative to glucose levels. Individuals with type 2 do not need exogenous insulin to maintain life. A decrease in tissue response to insulin is often seen.

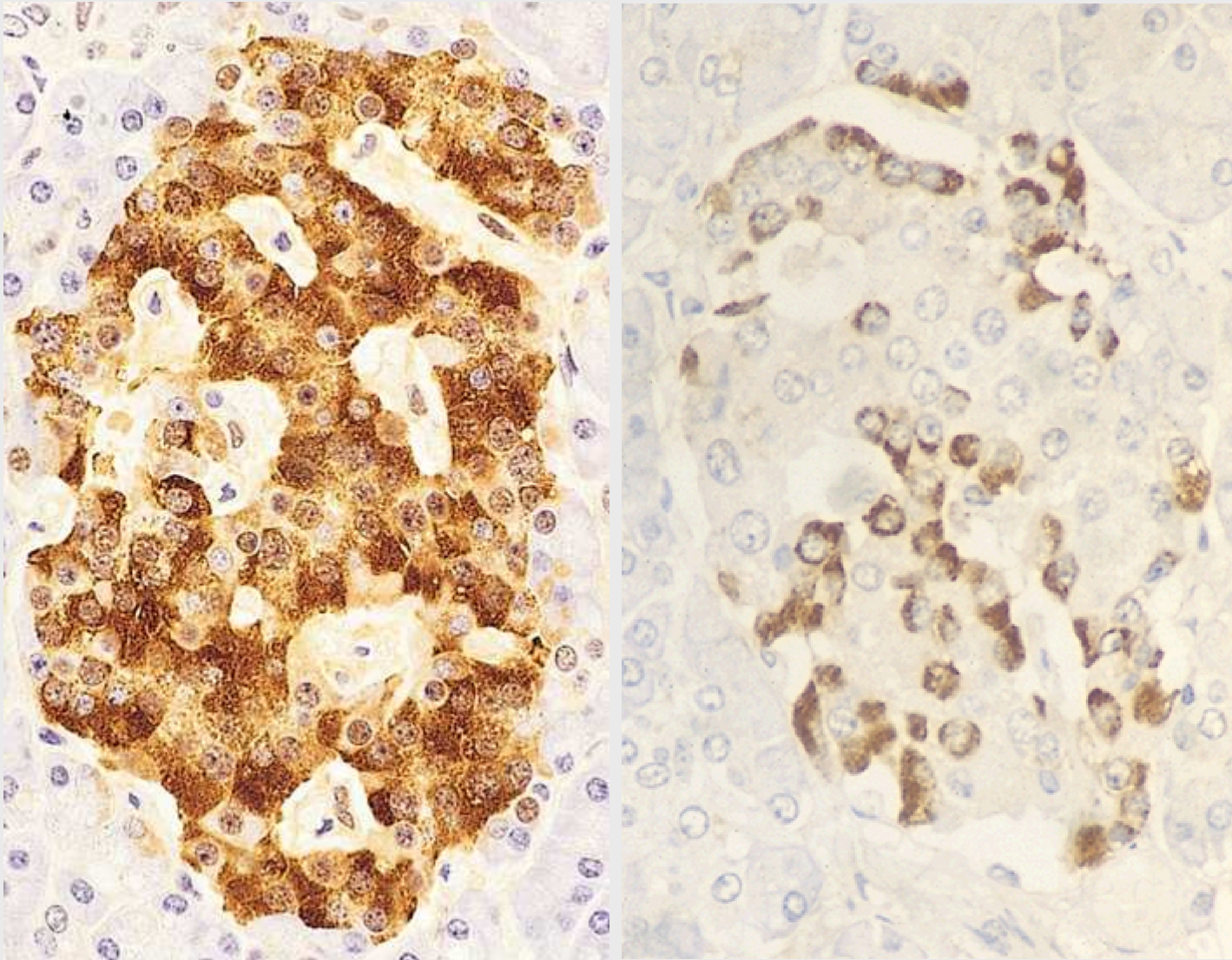


Insulin resistance of peripheral target tissues

Pancreas endocrino

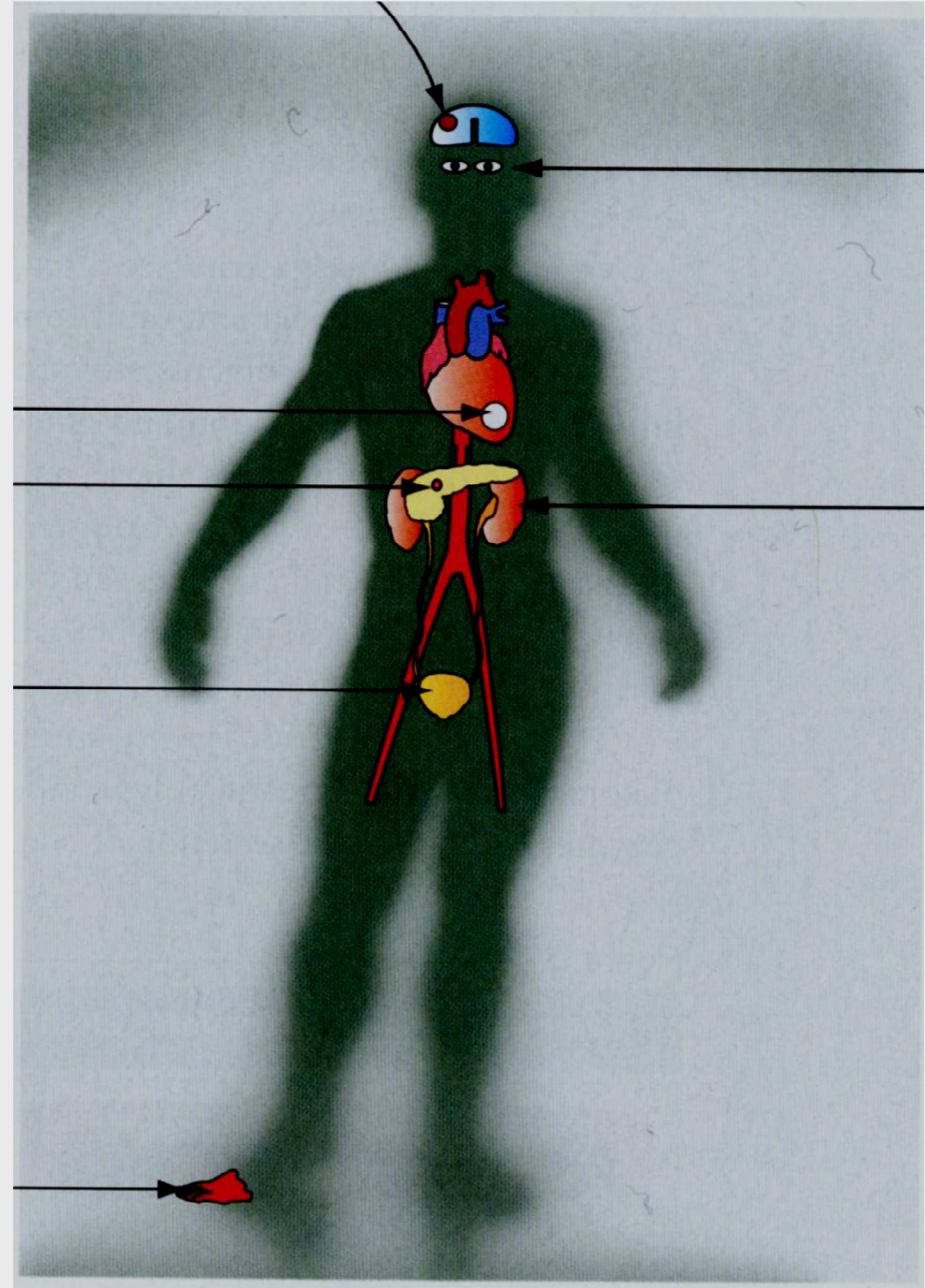


Pancreas endocrino: IIC per insulina e glucagone



Complicanze del diabete mellito

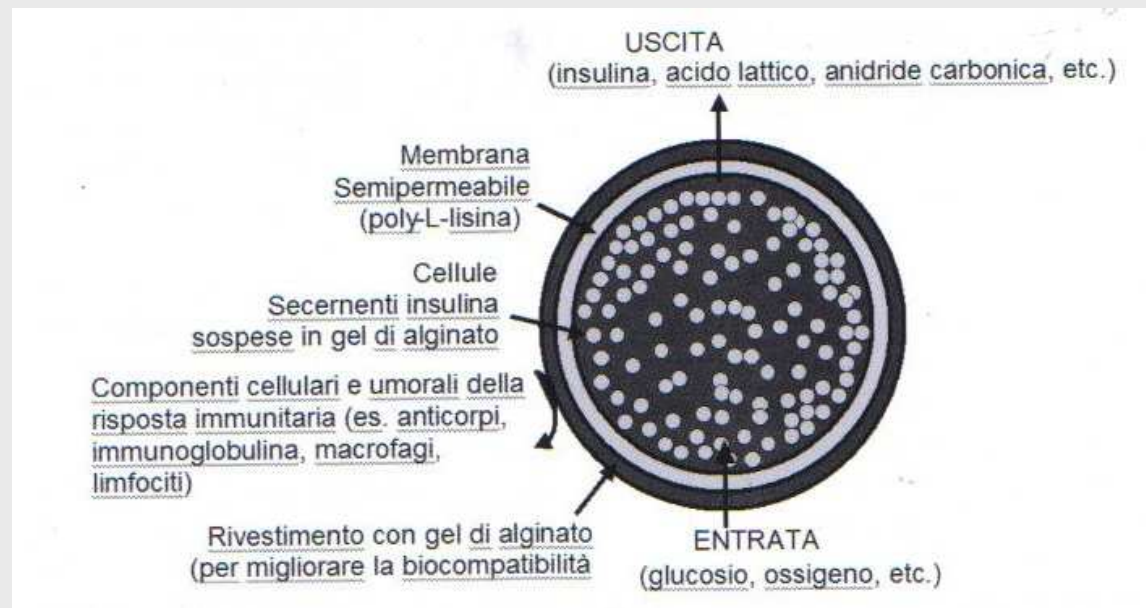
- aterosclerosi
arteriosclerosi
ipertensione
- infarto miocardico
infarto cerebrale
- retinopatia
cataratta, glaucoma
- glomerulosclerosi
- cancrena



Pancreas bio-artificiale (principio)

- Trapianto del pancreas in toto
- Trapianto delle isole di Langerhans
- → metabolismo glucosio OK, ma necessaria terapia immunosoppressiva
- → Immunisolare le isole tramite matrici o membrane semipermeabili
 - impermeabili a cellule e molecole coinvolte nella risposta immunitaria
 - permeabili a glucosio, O₂, altri nutrienti a basso PM e prodotti del metabolismo
- Possibilità di cellule allogeniche o xenogeniche

Pancreas bio-artificiale



Tipologie pancreas artificiale

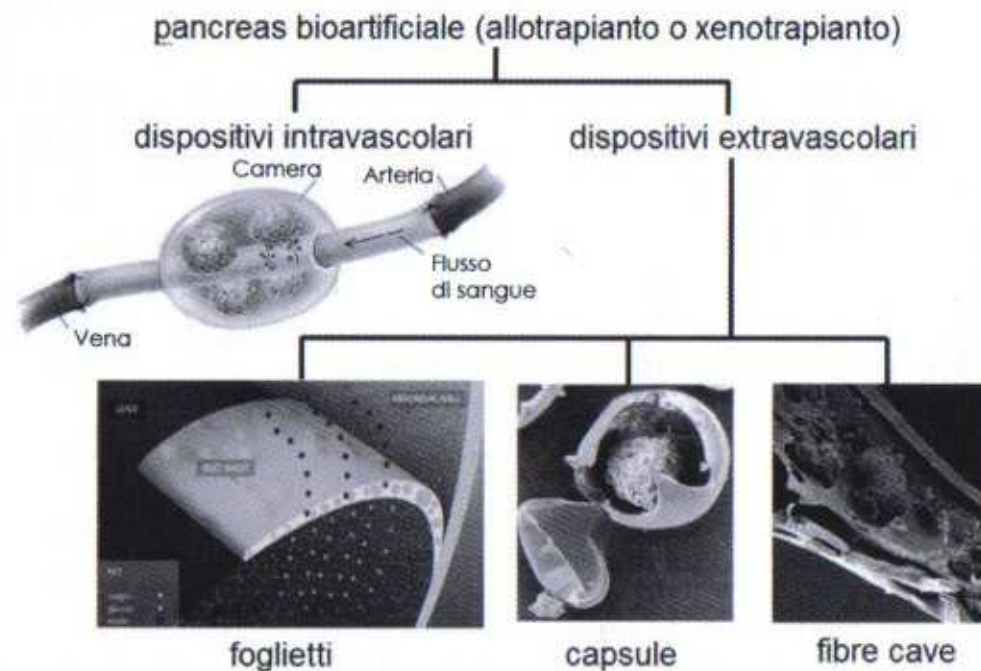


Fig. 5.27 Diverse tipologie utilizzate per lo studio di un pancreas bioartificiale.

Capsule per bio-pancreas

- Capsule: max rapporto superficie/volume
- Sodio alginato + Ca^{2+} (da alginato + CaCl_2)
- Impiantate intraperitoneo
- Resistono per lungo tempo (exp in animali)

Ma non applicabile all'uomo

- Necessario un troppo grande volume di capsule, x cui si aggregano e non sono più funzionalmente efficienti

Fibre cave per bio-pancreas

- Fibre (500 μm di diametro) di PTFE, copolimeri acrilici, acetato di cellulosa, ..
- Isole in sospensione in alginato, $\rightarrow$ inserite in fibre $\rightarrow$ immobilizzate x gelificazione
- Impiantate s.c. $\rightarrow$ facilmente rimuovibili

Exp in roditori

- Fibre cave (800 μm di diametro) con isole di maiale impiantate i.p. in topi diabetici
- → a 3 gg: livello glicemia normalizzato in 65% topi
- Funzionali x 21-40 gg
- Ricuperati: rivestiti da sottile strato fibrotico
- Risultati simili in ratti con impianto sotto-cutaneo
- Modelli exp anche in gatto e cane