

# OptiPrep™ Mini-Review MC05

## Purification of pancreatic islets – a bibliography

The reference list has been divided alphabetically into the **mammalian source** of the islets:

**Canine see p1; human, see pp1-7; murine see pp7-9; porcine see pp9-14;  
primate (non-human) see pp14; rat see pp14-16**

Each of these sections is divided further into **research topic groups**. References are listed alphabetically within each section according to first author and in cases of multiple entries, are listed chronologically. **A list of review articles is provided on pp16-17.**

- ◆ A description of the original methodology using a discontinuous iodixanol gradient in a centrifuge tube is given in **Application Sheet C15**. The method has been widely adapted to use of the COBE 2991 rotor, in which both continuous and discontinuous gradients have been used.

### Canine

**Harrington, S.**, Williams, S.J., Otte, V., Barchman, S., Jones, C., Ramachandran, K. and Stehno-Bittel, L. (2017) *Improved yield of canine islet isolation from deceased donors* BMC Vet. Res., **13**: 264

### Human

#### Chronic pancreatitis

**Bellin, M.D.**, Freeman, M.L., Schwarzenberg, S.J., Dunn, T.B., Beilman, G.J., Vickers, S.M., Chinnakotla, S., Balamurugan, A.N. et al (2011) *Quality of life improves for pediatric patients after total pancreatectomy and islet autotransplant for chronic pancreatitis* Clin. Gastroenterol. Hepatol., **9**, 793–799

**Matsumoto, S.**, Takita, M., Shimoda, M., Sugimoto, K., Itoh, T., Chujo, D., SoRelle, J.A., Tamura, Y. et al (2012) *Impact of tissue volume and purification on clinical autologous islet transplantation for the treatment of chronic pancreatitis* Cell Transplant., **21**, 625–632

**Balamurugan, A.**, Loganathan, G., Tweed, B., Tucker, W., Mokshagundam, S., Williams, S. and Hughes, M. (2016) *Isolating high islet mass even from alcoholic pancreatitis pancreases intended for clinical islet auto-transplantation: improved strategies to human islet isolation technique* Am. J. Transplant., **16(S3)**, abstr 81

#### Continuous gradients in bottles (large scale)

**Shimoda, M.**, Itoh, T., Iwahashi, S., Takita, M., Sugimoto, K., Kanak, M.A., Chujo, D., Naziruddin, B., Levy, M.F., Grayburn, P.A. and Matsumoto, S. (2012) *An effective purification method using large bottles for human pancreatic islet isolation* Islets **4**: 6

#### Encapsulation

**Baron, M.**, Veres, A., Wolock, S.L., Faust, A.L., Gaujoux, R., Vetere, A., Ryu, J.H., Wagner, B.K. et al (2016) *A single-cell transcriptomic map of the human and mouse pancreas reveals inter- and intra-cell population structure* Cell Systems **3**, 346–360

**Enck, K.**, McQuilling, J.P., Orlando, G., Tamburrini, R., Sivanandane, S. and Opara, E.C. (2017) *Selective osmotic shock (SOS)-based islet isolation for microencapsulation* In Methods Mol. Biol., **1479**, Cell Microencapsulation: Methods and Protocols (ed. Opara, E.C.) Springer Science+Business Media, LLC pp 191-198

#### Exosome production

**Hasilo, C.P.**, Negi, S., Allaey, I., Cloutier, N., Rutman, A.K., Gasparrini, M., Bonneil, E., Thibault, P., Boilard, E. and Paraskevas, S. (2017) *Presence of diabetes autoantigens in extracellular vesicles derived from human islets* Sci. Rep., **7**, 5000

## Extracellular matrix attachment

**Peloso, A.**, Urbani, L., Cravedi, P., Katari, R., Maghsoudlou, P., Alvarez Fallas, M.E., Sordi, V., Citro, A. et al (2016) *The human pancreas as a source of protolerogenic extracellular matrix scaffold for a new-generation bioartificial endocrine pancreas* Ann. Surg., **264**, 169–179

## Gene delivery

**Cheng, K.**, Fraga, D., Zhang, C., Kotb, M., Gaber, A.O., Guntaka, R.V. and Mahato, R.I. (2004) *Adenovirus-based vascular endothelial growth factor gene delivery to human pancreatic islets* Gene Ther., **11**, 1105–1116

**Mahato, R.I.**, Henry, J., Narang, A.S., Sabek, O., Fraga, D., Kotb, M. and Gaber, A.O. (2003) *Cationic lipid and polymer based gene delivery to human pancreatic cells* Mol. Ther., **7**, 89–100

**Narang, A.S.**, Cheng, K., Henry, J., Zhang, C., Sabek, O., Fraga, D., Kotb, M., Gaber, O. and Mahato, R.I. (2004) *Vascular endothelial growth factor gene delivery for revascularization in transplanted human islets* Pharmaceut. Res., **21**, 15–25

## Large scale multi-site production

**Ricordi, C.**, Goldstein, J.S., Balamurugan, A.M., Szot, G.L., Kin, T., Liu, C., Czarniecki, C.W., Barbaro, B., Bridges, N.D. et al (2016) *National Institutes of Health-sponsored clinical islet transplantation consortium phase 3 trial: manufacture of a complex cellular product at eight processing facilities* Diabetes, **65**, 3418–3428

## N-glycan profiles

**Miyagawa, S.**, Maeda, A., Kawamura, T., Ueno, T., Usui, N., Kondo, S., Matsumoto, S., Okitsu, T., Goto, M. and Nagashima, H. (2014) *A comparison of the main structures of N-glycans of porcine islets with those from humans* Glycobiology, **24**, 125–138

## Progenitor cells

**Lee, S.**, Lee, C.M. and Kim, S.C. (2016) *Adult human pancreas-derived cells expressing stage-specific embryonic antigen 4 differentiate into Sox9-expressing and Ngn3-expressing pancreatic ducts in vivo* Stem Cell Res. Ther., **7**: 162

## Transcription regulation

**Lawrence, M.C.**, McGlynn, K., Shao, C., Duan, L., Naziruddin, B., Levy, M.F. and Cobb, M.H. (2008) *Chromatin-bound mitogen-activated protein kinases transmit dynamic signals in transcription complexes in  $\beta$ -cells* Proc. Natl. Acad. Sci. USA., **105**, 13315–13320

## Transplantation

### Allotransplant and autotransplant recipients

**Bellin, M.D.**, Sutherland, D.E.R., Beilman, G.J., Hong-McAtee, I., Balamurugan, A.N., Hering, B.J. and Moran, A. (2011) *Similar islet function in islet allotransplant and autotransplant recipients, despite lower islet mass in autotransplants* Transplantation, **91**, 367–372

### Anti-inflammatory strategy

**Mita, A.**, Ricordi, C., Messinger, S., Miki, A., Misawa, R., Barker, S., Molano, R.D., Haertter, R. et al (2010) *Antipro-inflammatory effects of iodixanol (OptiPrep)-based density gradient purification on human islet preparations* Cell Transplant., **19**, 1537–1546

**Takita, M.**, Matsumoto, S., Shimoda, M., Chujo, D., Itoh, T., SoRelle, J.A., Purcell, K., Onaca, N., Naziruddin, B. and Levy, M.F. (2012) *Safety and tolerability of the T-cell depletion protocol coupled with anakinra and etanercept for clinical islet cell transplantation* Clin. Transplant., **26**, E471–E484

### Clinical problems

**Naziruddin, B.**, Iwahashi, S., Kanak, M.A., Takita, M., Itoh, T. and Levy, M.F. (2014) *Evidence for instant blood-mediated inflammatory reaction in clinical autologous islet transplantation* Am. J. Transplant., **14**, 428–437

**Takita, M.**, Matsumoto, S., Noguchi, H., Shimoda, M., Ikemoto, T., Chujo, D., Tamura, Y., Olsen, G.S. et al (2012) *Adverse events in clinical islet transplantation: one institutional experience* Cell Transplant., **21**, 547–551

**Wang, L-j.**, Young, S., Misawa, R., Azzam, R., Wang, X., Gołab, K., Cochet, O., Savari, O., Tibudan, M. et al (2014) *Chronic pancreatitis and primary sclerosing cholangitis—first report of intrahepatic autologous islet transplantation* J. Gastrointest. Surg., **18**, 845–850

#### Collagenase effects

**Balamurugan, A.N.**, Breite, A.G., Anazawa, T., Loganathan, G., Wilhelm, J.J., Papas, K.K., Dwulet, F.E., McCarthy, R.C. and Hering, B.J. (2010) *Successful human islet isolation and transplantation indicating the importance of class I collagenase and collagen degradation activity assay* Transplantation, **89**, 954–961

#### Culture effects and islet function

**Gaber, A. O.**, Fraga, D.W., Callicutt, C.S., Gerling, I.C., Sabek, O.M. and Kotb, M.Y. (2001) *Improved in vivo pancreatic islet function after prolonged in vitro islet culture* Transplantation, **72**, 1730-1736

**Hering, B.J.**, Kandaswamy, R., Harmon, J.V., Ansite, J.D., Clemmings, S.M., Sakai, T., Paraskevas, S., Eckman, P.M. et al (2004) *Transplantation of cultured islets from two-layer preserved pancreases in type 1 diabetes with anti-CD3 antibody* Am. J. Transplant., **4**, 390-401

**Noguchi, H.**, Naziruddin, B., Jackson, A., Shimoda, M., Ikemoto, T., Fujita, Y., Chujo, D., Takita, M. et al (2010) *Low-temperature preservation of isolated islets is superior to conventional islet culture before islet transplantation* Transplantation, **89**, 47-54

**Noguchi, H.**, Naziruddin, B., Jackson, A., Shimoda, M., Ikemoto, T., Fujita, Y., Chujo, D., Takita, M. et al (2012) *Fresh islets are more effective for islet transplantation than cultured islets* Cell Transplant., **21**, 517–523

**Rush, B.T.**, Fraga, D.W., Kotb, M.Y., Sabek, O.M., Lo, A., Gaber, L.W., Halim, A-B. and Gaber, A.A. (2004) *Preservation of human pancreatic islet in vivo function after 6-month culture in serum-free media* Transplantation, **77**, 1147-1154

#### Donor pancreas optimization

**Matsumoto, S.**, Noguchi, H., Takita, M., Shimoda, M., Tamura, Y., Olsen, G., Naziruddin, B., Onaca, N. and Levy, M.F. (2010) *ET-Kyoto ductal injection and density-adjusted purification combined with potent anti-inflammatory strategy facilitated single-donor islet transplantation: case reports* Transplant. Proc., **42**, 2159–2161

**Noguchi, H.** and Matsumoto, S. (2008) *Islet transplantation at the Diabetes Research Institute Japan* J. Hepatobiliary Pancreat. Surg., **15**, 278-283

**Noguchi, H.**, Naziruddin, B., Jackson, A., Shimoda, M., Ikemoto, T., Fujita, Y., Chujo, D., Takita, M. et al (2010) *Low-temperature preservation of isolated islets is superior to conventional islet culture before islet transplantation* Transplantation, **89**, 47-54

#### Donor selection (living)

**Noguchi, H.** and Matsumoto, S. (2008) *Islet transplantation at the Diabetes Research Institute Japan* J. Hepatobiliary Pancreat. Surg., **15**, 278-283

#### Donor selection (marginal cadaver)

**Nagata, H.**, Matsumoto, S., Okitsu, T., Iwanaga, Y., Noguchi, H., Yonekawa, Y., Kinukawa, T., Shimizu, T. et al (2006) *Procurement of the human pancreas for pancreatic islet transplantation from marginal cadaver donors* Transplantation, **82**, 327-331

#### Donor selection (non-heart beating)

**Matsumoto, S.** and Tanaka, K. (2005) *Pancreatic islet transplantation using non-heart-beating donors (NHBDs)* J. Hepatobiliary Pancreat. Surg., **12**, 227-230

**Noguchi, H.**, Iwanaga, Y., Okitsu, T., Nagata, H., Yonekawa, Y. and Matsumoto, S. (2006) *Evaluation of islet transplantation from non-heart beating donors* Am. J. Transplant., **6**, 2476-2482

**Noguchi, H.** and Matsumoto, S. (2008) *Islet transplantation at the Diabetes Research Institute Japan* J. Hepatobiliary Pancreat. Surg., **15**, 278-283

**Noguchi, H.**, Yamada, Y., Okitsu, T., Iwanaga, Y., Nagata, H., Kobayashi, N., Hayashi, S. and Matsumoto, S. (2008) *Secretory unit of islet in transplantation (SUIT) and engrafted islet rate (EIR) indexes are useful for evaluating single islet transplantation* Cell Transplant., **17**, 121-128

**Okitsu, T.**, Matsumoto, S., Iwanaga, Y., Noguchi, H., Nagata, H., Yonekawa, Y., Maekawa, T. and Tanaka, K. (2005) *Kyoto islet isolation method: the optimized one for non-heart-beating donors with highly efficient islet retrieval* Transplant. Proc., **37**, 3391-3392

**Saito, T.**, Gotoh, M., Satomi, S., Uemoto, S., Kenmochi, T., Itoh, T., Kuroda, Y., Yasunami, Y., Matsumoto, S. and Teraoka, S. (2010) *Islet transplantation using donors after cardiac death: report of the Japan Islet Transplantation Registry* Transplantation, **90**, 740–747

#### Donor selection (paediatric patients)

**Bellin, M.D.**, Blondet, J.J., Beilman, G.J., Dunn, T.B., Balamurugan, A.N., Thomas, W., Sutherland D.E.R., Moran, A. (2010) *Predicting islet yield in pediatric patients undergoing pancreatectomy and autoislet transplantation for chronic pancreatitis* *Pediatr. Diabetes*, **11**, 227–234

#### Donor selection (review)

**Kin, T.** (2010) *Islet isolation for clinical transplantation* In *Adv. Exp. Med. Biol.*, **654**, The Islets of Langerhans (ed. Islam, M.S.) Springer Science + Business Media pp. 683-710

#### Donor selection (single donor)

**Hering, B.J.**, Kandaswamy, R., Ansite, J.D., Eckman, P.M., Nakano, M., Sawada, T., Matsumoto, I., Ihm, S-H. et al (2005) *Single-donor, marginal-dose islet transplantation in patients with type 1 diabetes* *J. Am. Med. Assoc.* 830-835

**Matsumoto, S.**, Noguchi, H., Takita, M., Shimoda, M., Tamura, Y., Olsen, G., Naziruddin, B., Onaca, N. and Levy, M.F. (2010) *ET-Kyoto ductal injection and density-adjusted purification combined with potent anti-inflammatory strategy facilitated single-donor islet transplantation: case reports* *Transplant. Proc.*, **42**, 2159–2161

#### Immunosuppression of diabetic patient

**Bellin, M.D.**, Kandaswamy, R., Parkey, J., Zhang, H-J., Liu, B., Ihm, S.H., Ansite, J.D., Witson, J. et al (2008) *Prolonged insulin independence after islet allotransplants in recipients with type 1 diabetes* *Am. J. Transplant.*, **8**, 2463-2470

**Hering, B.J.**, Kandaswamy, R., Ansite, J.D., Fckman, P.M., Nakano, M., Sawada, T., Matsumoto, I., Ihm, S-H., Zhang, H-J., Hunter, D.W. and Sutherland, D.E.R. (2003) *Successful single donor islet transplantation in type 1 diabetes* *Int. Pancreas Islet Transpl. Assoc.*, Abstr. 012

**Hering, B.J.**, Kandaswamy, R., Harmon, J.V., Ansite, J.D., Clemmings, S.M., Sakai, T., Paraskevas, S., Eckman, P.M. et al (2004) *Transplantation of cultured islets from two-layer preserved pancreases in type 1 diabetes with anti-CD3 antibody* *Am. J. Transplant.*, **4**, 390-401

**Takita, M.**, Matsumoto, S., Shimoda, M., Chujo, D., Itoh, T., SoRelle, J.A., Purcell, K., Onaca, N., Naziruddin, B. and Levy, M.F. (2012) *Safety and tolerability of the T-cell depletion protocol coupled with anakinra and etanercept for clinical islet cell transplantation* *Clin. Transplant.*, **26**, E471–E484

#### OptiPrep – Ficoll comparison

**Mita, A.**, Ricordi, C., Messinger, S., Miki, A., Misawa, R., Barker, S., Molano, R.D., Haertter, R. et al (2010) *Anti-pro-inflammatory effects of iodixanol (OptiPrep)-based density gradient purification on human islet preparations* *Cell Transplant.*, **19**, 1537–1546

#### Supplemental islet transplantation

**Matsumoto, S.**, Takita, M., Shimoda, M., Chujo, D., Itoh, T., Iwahashi, S., SoRelle, J.A., Tamura, Y. et al (2011) *Insulin independence by supplemental islet transplantation 5 years after initial islet transplantation* *J. Diabetes*, **3**, 353–355

#### Warm ischaemia

**Matsumoto, S.** and Tanaka, K. (2005) *Pancreatic islet transplantation using non-heart-beating donors (NHBDs)* *J. Hepatobiliary Pancreat. Surg.*, **12**, 227-230

**Nagata, H.**, Matsumoto, S., Okitsu, T., Iwanaga, Y., Noguchi, H., Yonekawa, Y., Kinukawa, T., Shimizu, T. et al (2006) *Procurement of the human pancreas for pancreatic islet transplantation from marginal cadaver donors* *Transplantation*, **82**, 327-331

#### Yield/viability/function

##### $\beta$ -cell proliferation

**Purwana, I.**, Zheng, J., Li, X., Deurloo, M., Son, D.O., Zhang, Z. et al (2014) *GABA promotes human  $\beta$ -cell proliferation and modulates glucose homeostasis* *Diabetes*, **63**, 4197–4205

##### Chemokine/Cytokine production

**Mita, A.**, Ricordi, C., Miki, A., Barker, S., Khan, A., Alvarez, A., Hashikura, Y., Miyagawa, S., and Ichii, H. (2008) *The purification method using iodixanol (OptiPrep)-based density gradient significantly reduce cytokine/chemokine production from human islet preparations, leading to prolonged cell survival during culture* *Transplantation* **86** (Suppl. 2) 570

**Mita, A.**, Ricordi, C., Miki, A., Barker, S., Khan, A., Alvarez, A., Hashikura, Y., Miyagawa, S. and Ichii, H. (2009) *Purification method using iodixanol (OptiPrep)-based density gradient significantly reduces cytokine*

*chemokine production from human islet preparations, leading to prolonged  $\beta$ -cell survival during pretransplantation culture* Transplant. Proc., **41**, 314-315

**Sabek, O.M.**, Fraga, D.W., Henry, J., Gaber, L.W., Kotb, M. and Gaber, A.O. (2007) *Expression of transforming growth factor- $\beta$  by human islets: impact in islet viability and function* Cell Transplant., **16**, 775-785

#### Collagenase

**Balamurugan, A.N.**, Green, M.L., Breite, A.G., Loganathan, G., Wilhelm, J.J., Tweed, B., Vargova, L. Lockridge, A., Kuriti, M. et al (2016) *Identifying effective enzyme activity targets for recombinant class I and class II collagenase for successful human islet isolation* Transplant. Dir., **2**, e54

#### Culture (short-term) and other treatments of isolated islets

**Ihm, S-H.**, Matsumoto, I., Zhang, H.J., Ansite, J.D. and Hering, B.J. (2009) *Effect of short-term culture on functional and stress-related parameters in isolated human islets* Transplant Int., **22**, 207-216

**Noguchi, H.**, Naziruddin, B., Jackson, A., Shimoda, M., Ikemoto, T., Fujita, Y., Chujo, D., Takita, M. et al (2010) *Low-temperature preservation of isolated islets is superior to conventional islet culture before islet transplantation* Transplantation, **89**, 47-54

**Noguchi, H.**, Naziruddin, B., Jackson, A., Shimoda, M., Ikemoto, T., Fujita, Y., Chujo, D., Takita, M. et al (2012) *Fresh islets are more effective for islet transplantation than cultured islets* Cell Transplant., **21**, 517-523

#### Donor type and age, effect of

**Anazawa, T.**, Balamurugan, A.N., Bellin, M., Zhang, H.J., Matsumoto, S., Yonekawa, Y., Tanaka, T., Loganathan, G. et al (2009) *Human islet isolation for autologous transplantation: comparison of yield and function using SERVA/Nordmark versus Roche enzymes* Am. J. Transplant., **9**, 2383-2391

**Avila, J.G.**, Agarwal, A., Turgeon, N., Cano, J.A., Turner, A., Russell, M.C., Kirk, A.D., Pearson, T., C.P. Larsen (2009) *Identification of critical factors leading to successful islet isolations and transplantation* Am. J. Transplant., **9**, Supp 2, 406

**Bellin, M.D.**, Blondet, J.J., Beilman, G.J., Dunn, T.B., Balamurugan, A.N., Thomas, W., Sutherland D.E.R., Moran, A. (2010) *Predicting islet yield in pediatric patients undergoing pancreatectomy and autoislet transplantation for chronic pancreatitis* Pediatr. Diabetes, **11**, 227-234

**Ihm, S-H.**, Matsumoto, I., Sawada, T., Nakano, M., Zhang, H.J., Ansite, J.D., Sutherland, D.E.R. and Hering, B.J. (2006) *Effect of donor age on function of isolated human islets* Diabetes, **55**, 1361-1368

**Matsumoto, I.**, Sawada, T., Nakano, M., Sakai, T., Liu, B., Ansite, J.D., Zhang, H-J., Kandaswamy, R., Sutherland, D.E.R. and Hering, B.J. (2004) *Improvement in islet yield from obese donors for human islet transplantation* Transplantation, **78**, 880-885

**Matsumoto, S.**, Okitsu, T., Iwanaga, Y., Noguchi, H., Nagata, H., Yonekawa, Y., Yamada, Y., Fukuda, K. et al (2006) *Successful islet transplantation from nonheartbeating donor pancreata using modified Ricordi islet isolation method* Transplantation **82**, 460-465

#### Ductal perfusion

**Matsumoto, S.**, Noguchi, H., Takita, M., Shimoda, M., Tamura, Y., Olsen, G., Naziruddin, B., Onaca, N. and Levy, M.F. (2010) *ET-Kyoto ductal injection and density-adjusted purification combined with potent anti-inflammatory strategy facilitated single-donor islet transplantation: case reports* Transplant. Proc., **42**, 2159-2161

**Matsumoto, S.**, Noguichi, H., Shimoda, M., Ikemoto, T., Naziruddin, B., Jackson, A., Tamura, Y., Olson, G. et al (2010) *Seven consecutive successful clinical islet isolations with pancreatic ductal injection* Cell Transplant., **19**, 291-297

**Takita, M.**, Itoh, T., Shimoda, M., Kanak, M.A., Shahbazov, R., Kunnathodi, F., Lawrence, M.C., Naziruddin, B. and Levy, M.F. (2014) *Pancreatic ductal perfusion at organ procurement enhances islet yield in human islet isolation* Pancreas, **43**, 1249-1255

#### Endotoxin levels in reagents

**Linetsky, E.**, Inverardi, L., Kenyon, N.S., Alejandro, R. and Ricordi, C. (1998) *Endotoxin contamination of reagents used during isolation and purification of human pancreatic islets* Transplant. Proc., **30**, 345-346

#### Enzyme digestion

**Balamurugan, A.N.**, Loganathan, G., Bellin, M.D., Wilhelm, J.J., Harmon, J., Anazawa, T., Soltani, S.M., Radosevich, D.M. et al (2012) *A new enzyme mixture to increase the yield and transplant rate of autologous and allogeneic human islet products* Transplantation, **93**, 693-702

### Functional properties of gradient isolates

**Sweet, I.R.**, Cook, D.L., Wiseman, R.W., Greenbaum, C.J., Lernmark, A., Matsumoto, S., Teague, J.C. and Krohn, K.A. (2002) *Dynamic perfusion to maintain and assess isolated pancreatic islets* Diabetes Technol. Therapeut., **4**, 67-76

### GABA, effects of

**Prud'homme, G.J.**, Glinka, Y., Hasilo, C., Paraskevas, S., Li, X. and Wang, Q. (2013) *GABA protects human islet cells against the deleterious effects of immunosuppressive drugs and exerts immunoinhibitory effects alone* Transplantation, **96**, 616-623

**Purwana, I.**, Zheng, J., Li, X., Deurloo, M., Son, D.O., Zhang, Z. et al (2014) *GABA promotes human  $\beta$ -cell proliferation and modulates glucose homeostasis* Diabetes, **63**, 4197-4205

### Gradient methodology

**Anazawa, T.**, Matsumoto, S., Yonekawa, Y., Loganathan, G., Wilhelm, J.J., Soltani, S.M., Papas, K.K., Sutherland, D.E.R., Hering, B.J. and Balamurugan, A.N. (2011) *Prediction of pancreatic tissue densities by an analytical test gradient system before purification maximizes human islet recovery for islet autotransplantation /allograft transplantation* Transplantation, **91**, 508-51

**Mita, A.**, Ricordi, C., Messinger, S., Miki, A., Misawa, R., Barker, S., Molano, R.D., Haertter, R. et al (2009) *Superiority of iodixanol (OptiPrep) over Ficoll in human islet purification* Am. J. Transplant., **9** Suppl. 2, 406

**Noguchi, H.**, Ikemoto, T., Naziruddin, B., Jackson, A., Shimoda, M., Fujita, Y., Chujo, D., Takita, M. et al (2009) *Iodixanol-controlled density gradient during islet purification improves recovery rate in human islet isolation* Transplantation, **87**, 1629-1635

**Noguchi, H.**, Naziruddin, B., Shimoda, M., Fujita, Y., Chujo, D., Takita, M., Peng, H., Sugimoto, K. et al (2012) *Evaluation of osmolality of density gradient for human islet purification* Cell Transplant., **21**, 493-500

**Van der Burg, M.P.M.**, Ranunco, A., Molano, R., Kirlew, T., Ringers, J., Bouwman, E. and Ricordi, C. (1998) *Efficacy of the novel iodixanol – UWS density gradient for human islet purification* Acta Diabetol., **35**, 247

**Van der Burg, M.P.M.**, Ranunco, A., Molano, R., Kirlew, T., Ringers, J., Bouwman, E., Terpstra, O.T. and Ricordi, C. (1999) *OptiPrep for human islet purification* Cell Transplant., **8**, abstr. 57

**Yonekawa, Y.**, Balamurugan, A.N., Matsumoto, S., Tanaka, T., Gilmore, T.R., Ansite, J.D., Zhang, H., Sutherland, D.E.R. and Hering, B.J. (2007) *The use of test gradients to determine the bottom layer density for subsequent continuous isopycnic purification of human islets on a COBE 2991 cell processor* CTS-IPITA-IXA, Minneapolis 2007 Joint Conference Abstracts, p 480

### HMGB1 release levels

**Itoh, T.**, Takita, M., SoRelle, J.A., Shimoda, M., Sugimoto, K., Chujo, D., Qin, H., Naziruddin, B., Levy, M.F. and Matsumoto, S. (2012) *Correlation of released HMGB1 levels with the degree of islet damage in mice and humans and with the outcomes of islet transplantation in mice* Cell Transplant., **21**, 1371-1381

### IL-1 $\beta$ and TNF- $\alpha$ blockage

**Matsumoto, S.**, Takita, M., Chaussabel, D., Noguchi, H., Shimoda, M., Sugimoto, K., Itoh, T., Chujo, D. et al (2011) *Improving efficacy of clinical islet transplantation with iodixanol-based islet purification, thymoglobulin induction, and blockage of IL-1 $\beta$  and TNF- $\alpha$*  Cell Transplant., **20**, 1641-1647

### Metabolic assessment

**Lundberg, R.**, Beilman, G.J., Dunn, T.B., Pruett, T.L., Chinnakotla, S.C., Radosevich, D.M., Robertson, R.P., Ptacek, P. et al (2013) *Metabolic assessment prior to total pancreatectomy and islet autotransplant: utility, limitations and potential* Am. J. Transplant., **13**, 2664-2671

### Multi-centre analysis

**Kaddis, J.S.**, Danobeitia, J.S., Niland, J.C., Stiller, T. and Fernandez, L.A. (2010) *Multicenter analysis of novel and established variables associated with successful human islet isolation outcomes* Am. J. Transplant., **10**, 646-656

### Non-heart-beating cadavers

**Liu, X.**, Matsumoto, S., Okitsu, T., Iwanaga, Y., Noguchi, H., Yonekawa, Y., Nagata, H., Kamiya, H. et al (2008) *Analysis of donor- and isolation-related variables from non-heart-beating donors (NHBDs) using the Kyoto islet isolation method* Cell Transplant., **17**, 649-656

**Matsumoto, S.**, Okitsu, T., Iwanaga, Y., Noguchi, H., Nagata, H., Yonekawa, Y., Yamada, Y., Fukuda, K. et al (2006) *Successful islet transplantation from nonheartbeating donor pancreata using modified Ricordi islet isolation method*

#### Pancreas treatment and preservation prior to gradient purification

**Avila, J.G.**, Agarwal, A., Turgeon, N., Cano, J.A., Turner, A., Russell, M.C., Kirk, A.D., Pearson, T., C.P. Larsen (2009) *Identification of critical factors leading to successful islet isolations and transplantation* Am. J. Transplant., **9**, Supp 2, 406

**Choi, S.J.**, Kim, F., Schwartz, M.W. and Wisse, B.E. (2010) *Cultured hypothalamic neurons are resistant to inflammation and insulin resistance induced by saturated fatty acids* Am. J. Physiol. Endocrinol. Metab., **298**, E1122–E1130

**Matsumoto, S.**, Rigley, T.H., Qualley, S.A., Kuroda, Y., Reems, J.A. and Stevens, R.B. (2002) *Efficacy of the oxygen-charged static two-layer method for short-term pancreas preservation and islet isolation from nonhuman primate and human pancreata* Cell Transplant. **11**, 769-777

**Sabek, O.M.**, Cowan, P., Fraga, D.W., Gaber, A.O. (2008) *The effect of isolation methods and the use of different enzymes on islet yield and in vivo function* Cell Transplant., **17**, 785-792

**Shimoda, M.**, Noguchi, H., Naziruddin, B., Fujita, Y., Chujo, D., Takita, M., Peng, H., Tamura, Y. et al (2010) *Assessment of human islet isolation with four different collagenases* Transplant. Proc., **42**, 2049–2051

**Shimoda, M.**, Itoh, T., Sugimoto, K., Takita, M., Chujo, D., Iwahashi, S., SoRelle, J.A., Naziruddin, B., Levy, M.F., Grayburn, P.A. and Matsumoto, S. (2011) *An effective method to release human islets from surrounding acinar cells with agitation in high osmolality solution* Transplant. Proc., **43**, 3161–3166

**Szot, G.L.**, Lee, M.R., Tavakol, M.M., Lang, J., Dekovic, F., Kerlan, R.K., Stock, P.G. and Posselt, A.M. (2009) *Successful clinical islet isolation using a GMP manufactured collagenase and neutral protease* Transplantation; **88**, 753–756

#### Portal vein infusion

**Shahbazov, R.**, Yoshimatsu, G., Haque, W.Z., Khan, O.S., Saracino, G., Lawrence, M.C., Kim, P. T. et al (2017) *Clinical effectiveness of a pylorus-preserving procedure on total pancreatectomy with islet auto-transplantation* Am. J. Surgery, **213**, 1065-1071

#### Thymoglobulin induction

**Matsumoto, S.**, Takita, M., Chaussabel, D., Noguchi, H., Shimoda, M., Sugimoto, K., Itoh, T., Chujo, D., SoRelle, J., Onaca, N., Naziruddin, B. and Levy, M.F. (2011) *Improving efficacy of clinical islet transplantation with iodixanol-based islet purification, thymoglobulin induction, and blockage of IL-1 $\beta$  and TNF- $\alpha$*  Cell Transplant., **20**, 1641–1647

#### Two-layer pancreas preservation prior to gradient

**Matsumoto, S.**, Rigley, T.H., Qualley, S.A., Kuroda, Y., Reems, J.A. and Stevens, R.B. (2002) *Efficacy of the oxygen-charged static two-layer method for short-term pancreas preservation and islet isolation from nonhuman primate and human pancreata* Cell Transplant. **11**, 769-777

**Matsumoto, S.**, Rigley, T.H., Reems, J.A., Kuroda, Y. and Stevens, R.B. (2003) *Improved islet yields from Macaca Nemestrina and marginal human pancreata after two-layer method preservation and endogenous trypsin inhibition* Am. J. Transplant., **3**, 53-63

## Mouse

### Amyloid polypeptide

**Rodriguez Camargo, D.C.**, Tripsianes, K., Buday, K., Franko, A., Göbl, C., Hartlmüller, C., Sarkar, R., Aichler, M., Mettenleiter, G. et al (2017) *The redox environment triggers conformational changes and aggregation of hIAPP in Type II Diabetes* Sci. Rep., **7**: 44041

### Apoptotic ER signals

**Ladiges, W.C.**, Knoblauch, S.E., Morton, J.F., Korth, M.J., Sopher, B.L., Baskin, C.R., MacAuley, A., Goodman, A.G., LeBoeuf, R.C. and Katze, M.G. (2005) *Pancreatic  $\beta$ -cell failure and diabetes in mice with a deletion mutation of the endoplasmic reticulum molecular chaperone gene P58<sup>IPK</sup>* Diabetes, **54**, 1074-1081

### $\beta$ cell function

**Bollyky, P.L.**, Bice, J.B., Sweet, I.R., Falk, B.A., Gebe, J.A., Clark, A.E., Gersuk, V.H., Aderem, A., Hawn, T.R. and Nepom, G.T. (2009) *The Toll-like receptor signaling molecule Myd88 contributes to pancreatic Beta-cell homeostasis in response to injury* PLoS One, **4**:e5063

**Ladiges, W.C.**, Knoblaugh, S.E., Morton, J.F., Korth, M.J., Sopher, B.L., Baskin, C.R., MacAuley, A., Goodman, A.G., LeBoeuf, R.C. and Katze, M.G. (2005) *Pancreatic  $\beta$ -cell failure and diabetes in mice with a deletion mutation of the endoplasmic reticulum molecular chaperone gene  $P58^{IPK}$*  Diabetes, **54**, 1074-1081  
**Pechhold, K.**, Koczwara, K., Zhu, X., Harrison, V.S., Walker, G., Lee, J. and D.M. Harlan (2009) *Blood glucose levels regulate pancreatic  $\beta$ -cell proliferation during experimentally-induced and spontaneous autoimmune diabetes in mice* PLoS One **4**:e4827

### Encapsulation

**Baron, M.**, Veres, A., Wolock, S.L., Faust, A.L., Gaujoux, R., Vetere, A., Ryu, J.H., Wagner, B.K. et al (2016) *A single-cell transcriptomic map of the human and mouse pancreas reveals inter- and intra-cell population structure* Cell Systems **3**, 346–360

### Endocrine cell proliferation and function

**Pechhold, K.**, Zhu, X., Harrison, V.S., Lee, J., Chakrabarty, S., Koczwara, K., Gavrilova, O. and Harlan, D.M. (2009) *Dynamic changes in pancreatic endocrine cell abundance, distribution, and function in antigen-induced and spontaneous autoimmune diabetes* Diabetes **58**, 1175-1184

**Pechhold, S.**, Stouffer, M., Walker, G., Martel, R., Seligmann, B., Hang, Y., Stein, R., Harlan, D.M. and Pechhold, K. (2009) *Transcriptional analysis of intracytoplasmically stained, FACS-purified cells by high-throughput, quantitative nuclease protection* Nat. Biotech., **27**, 1038-1042

### Gene regulation

**Org, T.**, Rebane, A., Kisand, K., Laan, M., Haljasorg, U., Andreson, R. and Peterson, P. (2009) *AIRE activated tissue specific genes have histone modifications associated with inactive chromatin* Hum. Mol. Genet., **18**, 4699–4710

### Islet hormonal release

**Amisten, S.**, Meidute-Abaraviciene, S., Tan, C., Olde, B., Lundquist, I., Salehi, A. and Erlinge, D. (2010) *ADP mediates inhibition of insulin secretion by activation of  $P2Y_{13}$  receptors in mice* Diabetologia, **3**, 1927–1934

**Parandeh, F.**, Abaraviciene, S.M., Amisten, S., Erlinge, D. and Salehi, A. (2008) *Uridine diphosphate (UDP) stimulates insulin secretion by activation of  $P2Y_6$  receptors* Biochem. Biophys. Res. Commun., **370**, 499-503

### Islet neogenesis associated protein

**Taylor-Fishwick, D.A.**, Bowman, A., Hamblet, N., Bernard, P., Harlan, D.M. and Vinik, A.I. (2006) *Islet neogenesis associated protein transgenic mice are resistant to hyperglycemia induced by streptozotocin* J. Endocrinol., **190**, 729-737

**Taylor-Fishwick, D.A.**, Bowman, A., Korngiebel-Rosique, M.C. and Vinik, A.I. (2008) *Pancreatic islet immunoreactivity to the Reg protein  $INGAP$*  J. Histochem. Cytochem., **56**, 183-191

### Maturation

**Bastidas-Ponce, A.**, Roscioni, S.S., Burtscher, I., Bader, E., Sterr, M., Bakhti, M. and Lickert, H. (2017)  *$Foxa2$  and  $Pdx1$  cooperatively regulate postnatal maturation of pancreatic  $\beta$ -cells* Mol. Metab., **6**, 524-534

### Pancreatic development

**Banga, A.**, Akinci, E., Greder, L.V., Dutton, J.R. and Slack, J.M.W. (2012) *In vivo reprogramming of  $Sox9^+$  cells in the liver to insulin-secreting ducts* Proc. Natl. Acad. Sci. USA, **109**, 15336–15341

**Yang, Y.**, Akinci, E., Dutton, J.R., Banga, A. and Slack, J.M.W. (2013) *Stage specific reprogramming of mouse embryo liver cells to a beta cell-like phenotype* Mech. Dev., **130**, 602–612

### Von Hippel-Landau syndrome

**Shen, H-C.J.**, Adem, A., Ylaya, K., Wilson, A., He, M., Lorang, D., Hewitt, S.M., Pechhold, K. et al (2009) *Deciphering von Hippel-Lindau ( $VHL/Vhl$ )-associated pancreatic manifestations by inactivating  $Vhl$  in specific pancreatic cell populations* PLoS One, **4**:e4897

### Yield, viability and function

**Bader, E.**, Migliorini, A., Gegg, M., Moruzzi, N., Gerdes, J., Roscioni, S.S., Bakhti, M., Brand, E., Irmeler, M., Beckers, J., Aichler, M. et al (2016) *Identification of proliferative and mature  $\beta$ -cells in the islets of Langerhans* Nature, **535**, 430-434

**Machida, T.**, Tanemura, M., Ohmura, Y., Tanida, T., Wada, H., Kobayashi, S., Marubashi, S., Eguchi, H. et al (2013) *Significant improvement in islet yield and survival with modified ET-Kyoto solution: ET-Kyoto/neutrophil elastase inhibitor* Cell Transplant., **22**, 159–173

**Ohmura, Y.**, Tanemura, M., Kawaguchi, N., Machida, T., Tanida, T., Deguchi, T., Wada, H., Kobayashi, S. et al (2010) *Combined transplantation of pancreatic islets and adipose tissue-derived stem cells enhances the survival and insulin function of islet grafts in diabetic mice* Transplantation, **90**, 1366–1373

**Tanemura, M.**, Machida, T., Nagano, H., Wada, H., Kobayashi, S., Marubashi, S., Eguchi, H., Ito, T., Mori, M. and Doki, Y. (2011) *The inhibition of neutrophil elastase ameliorates islet yield and islet graft survival* Int. J. Transplant, **11**, 249

**Wu, C.**, Zhang, Y., Jiang, Y., Wang, Q., Long, Y., Wang, C., Cao, X. and Chen, G. (2013) *Apoptotic cell administration enhances pancreatic islet engraftment by induction of regulatory T cells and tolerogenic dendritic cells* Cell. Mol. Immunol., **10**, 393–402

## Porcine

### Antioxidant effects

**Chung, S.S.**, Kim, M., Lee, J.S., Ahn, B.Y., Jung, H.S., Lee, H.M. and Park, K.S. (2011) *Mechanism for antioxidative effects of thiazolidinediones in pancreatic  $\beta$ -cells* Am. J. Physiol. Endocrinol. Metab., **301**, E912–E921

### Culture of

**Weegman, B.P.**, Taylor, M.J., Baicu, S.C., Mueller, K., O'Brien, T.D., Wilson, J. and Papas, K.K. (2016) *Plasticity and aggregation of juvenile porcine islets in modified culture: preliminary observations* Cell Transplant., **25**, 1763–1775

### Glycans

**Kim, Y-G.**, Gil, G-C., Jang, K-S., Lee, S., Kim, H-i., Kim, J-S., Chung, J., Park, C-G., Harvey, D.J. and Kim, B-G. (2009) *Qualitative and quantitative comparison of N-glycans between pig endothelial and islet cells by high-performance liquid chromatography and mass spectrometry-based strategy* J. Mass. Spectrom., **44**, 1087–1104

**Kim, Y-G.**, Harvey, D.J., Yang, Y-H., Park, C-G. and Kim, B-G. (2009) *Mass spectrometric analysis of the glycosphingolipid-derived glycans from miniature pig endothelial cells and islets: identification of NeuGc epitope in pig islets* J. Mass. Spectrom., **44**, 1489–1499

**Miyagawa, S.**, Maeda, A., Kawamura, T., Ueno, T., Usui, N., Kondo, S., Matsumoto, S., Okitsu, T., Goto, M. and Nagashima, H. (2014) *A comparison of the main structures of N-glycans of porcine islets with those from humans* Glycobiology, **24**, 125–138

### Immune reactions

**Haque, M.R.**, Jeong, J-H. and Byun, Y. (2016) *Combination strategy of multi-layered surface camouflage using hyperbranched polyethylene glycol and immunosuppressive drugs for the prevention of immune reactions against transplanted porcine islets* Biomaterials, **84**, 144–156

**Jung, K.C.**, Park, C-G., Jeon, Y.K., Park, H.J., Ban, Y.L., Min, H.S, Kim, E.J., Kim, J.Y. et al (2011) *In situ induction of dendritic cell-based T cell tolerance in humanized mice and nonhuman primates* J. Exp. Med., **208**, 2477–2488

**Kawamoto, K.**, Tanemura, M., Saga, A., Komoda, H., Fumimoto, Y., Deguchi, T., Machida, T., Sawa, Y., Nishida, T. and Ito, T. (2008) *Adenoviral-mediated overexpression of either membrane-bound human FasL or human decoy Fas can prolong pig islet xenograft survival in a rat transplant model* Transplant. Proc., **40**, 477–479

**Lalain, S.**, Chaillous, L., Gouin, E. and Sai, P. (1999) *Intensity and mechanisms of in vitro xeno-recognition of adult pig pancreatic islet cells by  $CD_4^+$  and  $CD_8^+$  lymphocytes from type I diabetic or healthy subjects* Diabetologia, **42**, 330–335

**Lalain, S.**, Gianello, P., Gouin, E. and Sai, P. (2001) *In vitro recognition and impairment of pig islet cells by baboon immune cells* Transplantation, **72**, 1541–1548

**Ock, S.A.**, Lee, J., Oh, K.B., Hwang, S., Yun, I.J., Ahn, C., Chee, Hk., Kim, H. et al (2016) *Molecular immunology profiles of monkeys following xenografting with the islets and heart of  $\alpha$ -1,3-galactosyltransferase knockout pigs* Xenotransplantation, **23**, 357–369

**Rijkelijhuizen, J.K.**, Bouwman, E., van der Burg, M.P., Ringers, J., Ossevoort, M.A., Kuhn, E.M., Frost, P. and Jonker, M. (2000) *Successful suppression of the early rejection of pig islets in monkeys* Cell Transplant., **9**, 909–912

**Rijkelijhuizen, J.K.R.A.**, Haanstra, K.G., Wubben, J., Töns, A., Roos, A., van Gijlswijk-Janssen, D.J., Ringers, J., Bouwman, E. and Jonker, M. (2003) *T-cell specific immunosuppression results in more than 53 days survival of porcine islets of Langerhans in the monkey Transplantation*, **76**, 1359-1368

**You, S.**, Gouin, E. and Sai, P. (1998) *Spleen cells of non-obese diabetic mice fed with pig splenocytes display modified proliferation and reduced aggressiveness in vitro against pig islet cells Diabetologia*, **41**, 955-962

**You, S.**, Gouin, E. and Sai, P. (2002) *Feeding NOD mice with pig splenocytes induces transferable mechanisms that modulate cellular and humoral xenogeneic reactions against pig spleen or islet cells Clin. Exp. Immunol.*, **127**, 412-422

### Insulin release

**Lalain, S.**, Clémenceau, B., Gouin, E. and Sai, P. (2001) *In vitro co-incubation of pig islet cells with xenogenic human blood mononuclear cells causes loss of insulin release during perfusion: involvement of non-T-cell- and T-cell-mediated mechanism Hum. Immunol.*, **62**, 607-614

**Renner, S.**, Fehlings, C., Herbach, N., Hofmann, A., von Waldthausen, D.C., Kessler, B., Ulrichs, K., Chodnevskaja, I. et al (2010) *Glucose intolerance and reduced proliferation of pancreatic  $\beta$ -cells in transgenic pigs with impaired glucose-dependent insulinotropic polypeptide function Diabetes* **59**, 1228–1238

**You, S.**, Rivereau, A-S., Gouin, E. and Sai, P. (2001) *Co-incubation of pig-islet cells with spleen cells from non-obese mice causes decreased insulin release by non-T-cell- and T-cell-mediated mechanisms Clin. Exp. Immunol.*, **125**, 25-31

### Surface modification

**SoRelle, J.A.**, Kanak, M.A., Itoh, T., Horton, J.M., Naziruddin, B. and Kane, R.R. (2015) *Comparison of surface modification chemistries in mouse, porcine and human islets J. Biomed. Mater. Res. Part A*, **103A**, 869–877

### Transplantation

#### Encapsulation of islets

**Darrabie, M.D.**, Kendall, W.F. and Opara, E.C. (2005) *Characteristics of poly-L-ornithine-coated alginate microcapsules Biomaterials*, **26**, 6846-6852

**Pakhomov, O.**, Honiger, J., Gouin, E., Cariolet, R., Reach, G. and Darquy, S (2002) *Insulin treatment of mice recipients preserves  $\beta$ -cell function in porcine islet transplantation Cell Transplant.*, **11**, 721-728

**Yang, H.K.**, Ham, D-S., Park, H-S., Rhee, M., You, Y.H., Kim, M.J., Shin, J. et al (2016) *Long-term efficacy and biocompatibility of encapsulated islet transplantation with chitosan-coated alginate capsules in mice and canine models of diabetes Transplantation*, **100**, 334–343

**Zhu, H.**, Yu, L., He, Y., Lyu, Y. and Wang, B. (2015) *Microencapsulated pig islet xenotransplantation as an alternative treatment of diabetes Tissue Eng., Part B*, **21**, 474-489

#### Gradient influence of diabetes reversal

**Matsumoto, S.**, Shibata, S., Kirchoff, N., Hiraoka, K., Sageshima, J., Zhang, X.W., Gilmore, T., Ansite, J., Zhang, H.J., Suthreland, D.E.R. and Hering, B.J. (1999) *Immediate reversal of diabetes in primates following intraportal transplantation of porcine islets on a new histidine-lactobionate-iodixanol gradient Transplantation*, **67**, S220

**Min, T.**, Yi, L., Chao, Z., Haitao, Z., Wei, W., Liang, Y. and Bo, W. (2010) *Superiority of Visipaque (iodixanol)-controlled density gradient over Ficoll-400 in adult porcine islet purification Transplant. Proc.*, **42**, 1825–1829

#### Virus transmission

**Brewer, L.**, LaRue, R., Hering, B., Brown, C. and Njenga, M.K. (2004) *Transplanting encephalomyocarditis virus-infected porcine islet cells reverses diabetes in recipient mice but also transmits the virus Xenotransplantation*, **11**, 160-170

**Clemenceau, B.**, Jegou, D., Martignat, L. and Sai, P. (2001) *Long-term follow-up failed to detect in vitro transmission of full-length porcine endogenous retroviruses from specific pathogen-free pig islets to human cells Diabetologia*, **44**, 2044-2055

**Clemenceau, B.**, Jegou, D., Martignat, L. and Sai, P. (2002) *Microchimerism and transmission of porcine endogenous retrovirus from a pig cell line or specific pathogen-free pig islets to mouse tissues and human cells during xenografts in nude mice Diabetologia*, **45**, 914-923

**Myers, S. E.**, Brewer, L., Shaw, D.P., Greene, W.H., Love, B.C., Hering, B.J., Brad Spiller, O., Kariuki Njenga, M. (2004) *Prevalent human coxsackie B-5 virus infects porcine islet cells primarily using the coxsackie-adenovirus receptor Xenotransplantation*, **11**, 536-546

## Xenotransplantation

### ATP levels

**Kim, J.H.**, Park, S.G., Lee, H.N., Lee, Y.Y., Park, H.S., Kim, H-I., Yu, J.E., Kim, S.H., Park, C-G. et al (2009) *ATP measurement predicts porcine islet transplantation outcome in nude mice* Transplantation, **87**, 166-169

### Endothelial cell co-transplantation

**Kang, S.**, Park, H.S., Jo, A., Hong, S.H., Lee, H.N., Lee, Y.Y., Park, J.S., Jung, H.S., Chung, S.S. and Park, K.S. (2012) *Endothelial progenitor cell cotransplantation enhances islet engraftment by rapid revascularization* Diabetes, **61**, 866–876

### Fas expression, effect of

**Kawamoto, K.**, Tanemura, M., Saga, A., Komoda, H., Fumimoto, Y., Deguchi, T., Machida, T., Sawa, Y., Nishida, T. and Ito, T. (2008) *Adenoviral-mediated overexpression of either membrane-bound human FasL or human decoy Fas can prolong pig islet xenograft survival in a rat transplant model* Transplant. Proc., **40**, 477-479

### Immune suppression status of recipients

**Kirchhof, N.**, Shibata, S., Wijkstrom, M., Salerno, C.T., Clemmings, S.M., Heremans, Y., Galili, U., Sutherland, D.E.R., Dalmaso, A.P. and Hering B.J. (2004) *Reversal of diabetes in non-immunosuppressed rhesus macaques by intraportal porcine islet xenografts precedes acute cellular rejection* Xenotransplantation, **11**, 396-407

**Pakhomov, O.**, Honiger, J., Gouin, E., Cariolet, R., Reach, G. and Darquy, S (2002) *Insulin treatment of mice recipients preserves  $\beta$ -cell function in porcine islet transplantation* Cell Transplant., **11**, 721-728

**Rijkelijhuizen, J.K.R.A.**, Töns, Terpstra, O.T. and Bouwman, E. (2010) *Transplantation of long-term cultured porcine islets in the rat: prolonged graft survival and recipient growth on reduced immunosuppression* Cell Transplant., **19**, 387-398

**Tian, M.**, Lv, Y., Zhai, C., Zhu, H., Yu, L. and Wang, B. (2013) *Alternative immunomodulatory strategies for xenotransplantation: CD80/CD86-CTLA4 pathway-modified immature dendritic cells promote xenograft survival* PLoS One, **8**: e69640

### Pancreas pre-gradient treatments

**Anazawa, T.**, Balamurugan, A.N., Papas, K.K., Avgoustiniatos, E.S., Ferrer, J., Matsumoto, S., Sutherland, E.D.R. and Hering, B.J. (2010) *Improved method of porcine pancreas procurement with arterial flush and ductal injection enhances islet isolation outcome* Transplant. Proc., **42**, 2032–2035

**Jin, S-M.**, Shin, J.S., Kim, K.S., Gong, C-H., Park, S.K., Kim, J-S., Yeom, S-C., Hwang, E.S. et al (2011) *Islet isolation from adult designated pathogen-free pigs: use of the newer bovine nervous tissue-free enzymes and a revised donor selection strategy would improve the islet graft function* Xenotransplantation **18**, 369-379

### Preservation of $\beta$ -cell function

**Pakhomov, O.**, Honiger, J., Gouin, E., Cariolet, R., Reach, G. and Darquy, S (2002) *Insulin treatment of mice recipients preserves  $\beta$ -cell function in porcine islet transplantation* Cell Transplant., **11**, 721-728

### T cell effects

**Jung, K.C.**, Park, C-G., Jeon, Y.K., Park, H.J., Ban, Y.L., Min, H.S, Kim, E.J., Kim, J.Y. et al (2011) *In situ induction of dendritic cell-based T cell tolerance in humanized mice and nonhuman primates* J. Exp. Med., **208**, 2477-2488

**Zhai, C.**, Yu, L., Zhu, H., Tian, M., Xiaogang, Z., Bo, W. (2011) *Porcine CTLA4-Ig prolong islet xenografts in rats by downregulating the direct pathway of T-cell activation* Xenotransplantation **18**, 40–45

### VCAM-1, expression of

**Lee, S.**, Ha, I.S., Kim, J.Y., Park, K.S., Han, K.H., Kim, S-H., Chae, Y.C., Kim, S.H., Kim, Y.H. et al (2008) *Hydrogen peroxide-induced VCAM-1 expression in pancreatic islets and  $\beta$ -Cells through extracellular  $Ca^{2+}$  influx* Transplantation, **86**, 1257-1266

## Yield/viability/function

### Allograft functions

**Krickhahn, M.**, Meyer, T., Buchler, C., Thiede, A. and Ulrichs, K. (2001) *Highly efficient isolation of porcine islets of Langerhans for xenotransplantation: numbers, purity, yield and in vitro function* Ann. Transplant., **6**, 48-54

**Matsumoto, S.**, Zhang, H.J., Gilmore, T., van der Burg, M.P., Sutherland, D.E.R. and Hering, B.J. (1998) *Large scale isopycnic islet purification utilizing non-toxic, endotoxin-free media facilitates immediate single-donor pig islet allograft function* Transplantation, **66**, S30

#### Collagenase (recombinant)

**Green, M.**, Beechler, C., Breite, D., Dwulet, F. and McCarthy, R. (2013) *Optimization of a porcine islet isolation and purification procedure that utilizes recombinant collagenase* Xenotransplantation, **20**, 333

#### Culture effects on transplantation

**Rijkelijhuizen, J.K.R.A.**, Bouwman, E. and van der Burg, M.P.M. (1999) *Viability of fresh vs. cultured pig islets for transplant* Cell Transplant., **8**, abstr. 6

**Rijkelijhuizen, J.K.R.A.**, van der Burg, M.P.M., Töns, A., Terpstra, O.T. and Bouwman, E. (2006) *Pretransplant culture selects for high-quality porcine islets* Transplantation, **32**, 403-407

**Van der Burg, M.P.M.**, Zwaan, R.P. and Bouwman, E. (1998) *Markedly improved outcome of adult porcine islet isolation, purification, and culture using Liberase-P1 versus Collagenase-P, and a novel gradient of OptiPrep in University of Wisconsin solution* Horm. Metab. Res., **30**, A23

#### Gradient yield and purity

**Krickhahn, M.**, Meyer, T., Buchler, C., Thiede, A. and Ulrichs, K. (2001) *Highly efficient isolation of porcine islets of Langerhans for xenotransplantation: numbers, purity, yield and in vitro function* Ann. Transplant., **6**, 48-54

**Min, T.**, Yi, L., Chao, Z., Haitao, Z., Wei, W., Liang, Y. and Bo, W. (2010) *Superiority of Visipaque (iodixanol)-controlled density gradient over Ficoll-400 in adult porcine islet purification* Transplant. Proc., **42**, 1825–1829

**Miyagi-Shiohira, C.**, Kobayashi, N., Saitoh, I., Watanabe, M., Noguchi, Y., Matsushita, M. and Noguchi, H. (2017) *The evaluation of islet purification methods that use large bottles to create a continuous density gradient* Cell Med., **9**, 45–51

**Okitsu, T.** (2013) *Manual adult porcine islet isolation technique and optimal condition for adult pig islets* Xenotransplantation, **20**, 349

**Sack, F.D.**, Schwuchow, J.M., Wagner, T. and Kern, V. (2001) *Gravity sensing in moss protonemata* Adv. Space Res., **27**, 871-876

**Van der Burg, M.P.M.**, Basir, I. and Bouwman, E. (1998) *No porcine islet loss during density gradient purification in a novel iodixanol in University of Wisconsin solution* Transplant. Proc., **30**, 362-363

**Van der Burg, M.P.M.**, Zwaan, R.P. and Bouwman, E. (1998) *Markedly improved outcome of adult porcine islet isolation, purification, and culture using Liberase-P1 versus Collagenase-P, and a novel gradient of OptiPrep in University of Wisconsin solution* Horm. Metab. Res., **30**, A23

**Van der Burg, M.P.M.**, Rijkelijhuizen, J.K.R.A., Zwaan, R.P. and Bouwman, E. (1999) *Adult pig islet recovery during Liberase isolation, OptiPrep purification and culture for transplantation in nude mice* Cell Transplant., **8**, abstr. 58

**Van der Burg, M.P.M.** and Graham, J.M. (2003) *Iodixanol density gradient preparation in University of Wisconsin solution for porcine islet purification* Sci. World J., **3**, 1154-1159

#### Gradient yield, prediction of

**Anazawa, T.**, Balamurugan, A.N., Matsumoto, S., LaFreniere, S.A., O'Brien, T.D., Sutherland, D.E.T. and Hering, B.J. (2010) *Rapid quantitative assessment of the pig pancreas biopsy predicts islet yield* Transplant. Proc., **42**, 2036–2039

**Jin, S-M.**, Kim, K.S., Lee, S-Y., Gong, C-H., Park, S.K., Yu, J.E., Yeom, S-C., Yoon, T.W., Ha, J., Park, C-G. and Kim, S-J. (2010) *Enhanced prediction of porcine islet yield and posttransplant outcome using a combination of quantitative histomorphometric parameters and flow cytometry* Cell Transplant., **19**, 299–311

#### Islet function enhancement

**Lee, Y.Y.**, Hong, S.E., Lee, Y.J., Chung, S.S., Jung, H.S., Park, S.G. and Park, K.S. (2010) *Tauroursodeoxycholate (TUDCA), chemical chaperone, enhances function of islets by reducing ER stress* Biochem. Biophys. Res. Comm., **397**, 735–739

**Paraskevas, S.**, Aikin, R., Maysinger, D., Lakey, J.R.T., Cavanagh, T.J., Hering, B., Wang, R. and Rosenberg, L. (1999) *Activation and expression of ERK, JNK, and p38 MAP-kinases in isolated islets of Langerhans: implications for cultured islet survival* FEBS Lett., **455**, 203-208

### Large scale sterile separations

- Klaffschenkel, R.A.**, Biesemeier, A., Waidmann, M., Northoff, H., Steurer, W., Königsrainer, A. and Lember, N. (2007) *A closed system for islet isolation and purification using the COBE2991 cell processor may reduce the need of clean room facilities* Cell Transplant., **16**, 587-594
- Lember, N.**, Biesemeier, A., Klaffschenkel, R. and Königsrainer, A. (2006) *A closed system for the preparation of islets of Langerhans using the COBE2991 cell processor* Cytotherapy, **8**, Suppl. 2, 30
- Matsumoto, S.**, Zhang, H.J., Gilmore, T., van der Burg, M.P., Sutherland, D.E.R. and Hering, B.J. (1998) *Large scale isopycnic islet purification utilizing non-toxic, endotoxin-free media facilitates immediate single-donor pig islet allograft function* Transplantation, **66**, S30
- Shimoda, M.**, Noguchi, H., Fujita, Y., Takita, M., Ikemoto, T., Chujo, D., Naziruddin, B., Levy, M.F., Kobayashi, N., Grayburn, P.A. and Matsumoto, S. (2012) *Islet purification method using large bottles effectively achieves high islet yield from pig pancreas* Cell Transplant., **21**, 501–508

### Method optimization

- Shibata, S.**, Sageshima, J., Hiraoka, K., Zhang, H., Koyama, K., Sutherland, D.E.R. and Hering, B.J. (2001) *Low-speed isopycnic islet separation is effective and yields islets with superior quantity and quality* Int. Pancreas Islet Transplant. Assoc. Abstr. p. 5

### Morphology, islet

- Krickhahn, M.**, Bühler, C., Meyer, T., Thiede, A. and Ulrichs, K. (2002) *The morphology of islets within the porcine donor pancreas determines the isolation result: Successful isolation of pancreatic islets can now be achieved from young market pigs* Cell Transplant., **11**, 827-838
- Jin, S-M.**, Lee, H-S., Oh, S-H., Park, H.J., Park, J.B., Kim, J.H. and Kim, S.J. (2014) *Adult porcine islet isolation using a ductal preservation method and purification with a density gradient composed of histidine-tryptophan-ketoglutarate solution and iodixanol* Transplant. Proc., **46**, 1628-1632

### Osmolality effects

- Miyagi-Shiohira, C.**, Kobayashi, N., Saitoh, I., Watanabe, M., Noguchi, Y., Matsushita, M. and Noguchi, H. (2017) *Comparison of purification solutions with different osmolality for porcine islet purification* (2016) Cell Med. **9**, 53–59

### Pre-gradient treatments

- Anazawa, T.**, Balamurugan, A.N., Papas, K.K., Avgoustiniatos, E.S., Ferrer, J., Matsumoto, S., Sutherland, E.D.R. and Hering, B.J. (2010) *Improved method of porcine pancreas procurement with arterial flush and ductal injection enhances islet isolation outcome* Transplant. Proc., **42**, 2032–2035
- Loganathan, G.**, Graham, M.L., Spizzo, T., Tiwari, M., Lockridge, A.D., Soltani, S., Wilhelm, J.J., Balamurugan, A.N. and Hering, B.J. (2014) *Pretreatment of donor pigs with a diet rich in soybean oil increases the yield of isolated islets* Transplant. Proc., **46**, 1945-1949
- Matsumoto, S.**, Okitsu, T., Iwanaga, Y., Noguchi, H., Nagata, H., Yonekawa, Y., Yamada, Y., Fukuda, K. et al (2006) *Successful islet transplantation from nonheartbeating donor pancreata using modified Ricordi islet isolation method* Transplantation **82**, 460-465
- Matsumoto, S.**, Noguchi, H., Hatanaka, N., Shimoda, M., Kobayashi, N., Jackson, A., Onaca, N., Naziruddin, B. and Levy, M.F. (2009) *Estimation of donor usability for islet transplantation in the United States with the Kyoto islet isolation method* Cell Transplant., **18**, 549–556
- Noguchi, H.**, Ueda, M., Hayashi, S., Kobayashi, N., Okitsu, T., Iwanaga, Y., Nagata, H., Nakai, Y. and Mastsumoto, S. (2008) *Ductal injection of preservation solution increases islet yields in islet isolation and improves islet graft function* Cell Transplant., **17**, 69-81
- Van der Burg, M.P.M.**, Basir, I., Zwaan, R.P. and Bouwman, E. (1998) *Porcine islet preservation during isolation in University of Wisconsin solution* Transplant. Proc., **30**, 360-361
- Van der Burg, M.P.M.**, Zwaan, R.P. and Bouwman, E. (1998) *Markedly improved outcome of adult porcine islet isolation, purification, and culture using Liberase-P1 versus Collagenase-P, and a novel gradient of OptiPrep in University of Wisconsin solution* Horm. Metab. Res., **30**, A23
- Van der Burg, M.P.M.**, Rijkeljkhuizen, J.K.R.A., Zwaan, R.P. and Bouwman, E. (1999) *Adult pig islet recovery during Liberase isolation, OptiPrep purification and culture for transplantation in nude mice* Cell Transplant., **8**, abstr. 58
- Wee, Y.M.**, Kim, S.C., Koo, S.K., Kim, Y.H., Jung, E.J., Choi, M.Y., Park, Y.H., Park, K.T., Lim, D.G. and Han, D.J. (2008) *Improved islet yields after purification following the novel endogenous trypsin inhibitor and histidine-tryptophan-ketoglutarate treatment in pigs* Transplant. Proc., **40**, 2585-2587

### Special pathogen-free (SPF) pigs

**Kim, J.H.**, Kim, H-I., Lee, K-W., Yu, J.E., Kim, S.H., Park, H.S., Ihm, S-H., Ha, J. et al (2007) *Influence of strain and age differences on the yields of porcine islet isolation: extremely high islet yields from SPF CMS miniature pigs* Xenotransplantation, **14**, 60-66

**Kim, H-I.**, Lee, S-Y., Jin, S.M., Kim, K.S., YU, J.E., Yeom, S-C., Yoon, T.W., Kim, J.H., Ha, J., Park, C-G. and Kim, S-J. (2009) *Parameters for successful pig islet isolation as determined using 68 specific-pathogen-free miniature pigs* Xenotransplant., **16**, 11-18

### Trypsin inhibition

**Noguchi, H.**, Naziruddin, B., Jackson, A., Shimoda, M., Fujita, Y., Chujo, D., Takita, M., Peng, H. et al (2012) *Comparison of ulinastatin, gabexate mesilate, and nafamostat mesilate in preservation solution for islet isolation* Cell Transplant., **21**, 509–516

**Shimoda, M.**, Noguchi, H., Fujita, Y., Takita, M., Ikemoto, T., Chujo, D., Naziruddin, B., Levy, M.F., Kobayashi, N., Grayburn, P.A. and Matsumoto, S. (2012) *Improvement of porcine islet isolation by inhibition of trypsin activity during pancreas preservation and digestion using  $\alpha$ 1-antitrypsin* Cell Transplant., **21**, 465–471

### Primates (non-human)

**Abouaish, J.**, Graham, M., Bansal-Pakala, P., Loganathan, G., Soltani, S.M., Tiwari, M., Yuasa, T., Papas, K.K. et al (2011) *Successful isolation and transplantation of nonhuman primate islets using a novel purified enzyme blend* Transplantation, **92**, e41-e42

**Haque, M.R.**, Kim, J., Park, H., Lee, H.S., Lee, K.W., Al-Hilal, T.A., Jeong, J-H., Ahn, C-H. et al (2017) *Xenotransplantation of layer-by-layer encapsulated non-human primate islets with a specified immunosuppressive drug protocol* J. Control. Release, **258**, 10–21

**Jin, S-M.**, Shim, W., Oh, B.J., Oh, S-H., Yu, S.J., Choi, J.M., Park, H.J., Park, J.B. and Kim, J.H. (2017) *Anakinra protects against serum deprivation-induced inflammation and functional derangement in islets isolated from nonhuman primates* Am. J. Transpl., **17**, 365–376

**Lei, J.**, Kim, J.I., Shi, S., Zhang, X., Machaidze, Z., Lee, S., Schuetz, C., Martins, P.N., Oura, T., et al (2015) *Pilot study evaluating regulatory T cell-promoting immunosuppression and nonimmunogenic donor antigen delivery in a nonhuman primate islet allotransplantation model* Am. J. Transplant., **15**, 2739–2749

**Matsumoto, S.**, Rigley, T.H., Qualley, S.A., Kuroda, Y., Reems, J.A. and Stevens, R.B. (2002) *Efficacy of the oxygen-charged static two-layer method for short-term pancreas preservation and islet isolation from nonhuman primate and human pancreata* Cell Transplant. **11**, 769-777

**Matsumoto, S.**, Rigley, T.H., Reems, J.A., Kuroda, Y. and Stevens, R.B. (2003) *Improved islet yields from Macaca Nemestrina and marginal human pancreata after two-layer method preservation and endogenous trypsin inhibition* Am. J. Transplant., **3**, 53-63

**Park, H.**, Park, J.B., Kim, J.H., Lee, K.W., Lee, H.S., Kim, G-S., Shin, D-Y., et al (2017) *Simultaneous subtotal pancreatectomy and streptozotocin injection for diabetes modeling in cynomolgus monkeys* Transplant. Proc., **49**, 1142-1149

**Sasikala, M.**, Rao, G.V., Vijayalakshmi, V., Pradeep, R., Pothani, S., Kumar, P.P., Gaddipati, R., Sirisha, G. et al (2013) *Long-term functions of encapsulated islets grafted in nonhuman primates without immunosuppression* Transplantation, **96**, 624-632

### Rat

#### Allografts

**Dellê, H.** and Noronha, I.L. (2010) *Induction of indoleamine 2,3-dioxygenase by gene delivery in allogeneic islets prolongs allograft survival* Am. J. Transplant. **10**, 1918-1924

#### Amino acid transporter

**Chessler, S.D.**, Simonson, W.T., Sweet, I.R. and Hammerle, L.P. (2002) *Expression of the vesicular inhibitory amino acid transporter in pancreatic islet cells* Diabetes, **51**, 1763-1771

#### $\beta$ cell imaging

**Sweet, I.R.**, Cook, D.L., Lernmark, A., Greenbaum, C.J., Wallen, A.R., Marcum, E.S., Stekhova, S.A. and Krohn, K.A. (2004) *Systematic screening of potential  $\beta$ -cell imaging agents* Biochem. Biophys. Res. Commun., **314**, 976-983

## Ca<sup>2+</sup> metabolism

- Jung, S-R.**, Reed, B.J. and Sweet, I.R. (2009) *A highly energetic process couples calcium influx through L-type calcium channels to insulin secretion in pancreatic  $\beta$ -cells* Am. J. Physiol. Endocrinol. Metab., **297**, E717–E727
- Moustafa, A.** and Habara, Y. (2016) *Reciprocal interaction among gasotransmitters in isolated pancreatic  $\beta$ -cells* Free Radical Biol. Med. **90**, 47–58
- Rountree, A.M.**, Neal, A.S., Lisowski, M., Rizzo, N., Radtke, J., White, S., Luciani, D.S., Kim, F., Hampe, C.S. and Sweet, I.R. (2014) *Control of insulin secretion by cytochrome c and calcium signaling in islets with impaired metabolism* J. Biol. Chem., **289**, 19110–19119

## Donor nutrition

- Mishima, T.**, Kuroki, T., Tajima, Y., Adachi, T., Hirabaru, M., Tanaka, T., Kitasato, A., Takatsuki, M. and Eguchi, S. (2014) *Dietary zinc supplementation to the donor improves insulin secretion after islet transplantation in chemically induced diabetic rats* Pancreas, **43**, 236-239

## Encapsulation

- Baron, M.**, Veres, A., Wolock, S.L., Faust, A.L., Gaujoux, R., Vetere, A., Ryu, J.H., Wagner, B.K. et al (2016) *A single-cell transcriptomic map of the human and mouse pancreas reveals inter- and intra-cell population structure* Cell Systems **3**, 346–360
- Pareta, R.**, McQuilling, J.P., Sittadjody, S., Jenkins, R., Bowden, S., Orlando, G., Farney, A.C., Brey, E.M. and Opara, E.C. (2014) *Long-term function of islets encapsulated in a redesigned alginate microcapsule construct in omentum pouches of immune-competent diabetic rats* Pancreas, **43**, 605-613

## GAD-GABA system

- Suckow, A.T.**, Sweet, I.R., Van Yserloo, B., Rutledge, E.A., Hall, T.R., Waldrop, M. and Chessler, S.D. *Identification and characterization of a novel isoform of the vesicular  $\gamma$ -aminobutyric acid transporter with glucose-regulated expression in rat islets* J. Mol. Endocrinol., **36**, 187-199

## Glucose transport

- Shu, S.**, Liu, H., Wang, M., Su, D., Yao, L. and Wang, G. (2014) *Subchronic olanzapine treatment decreases the expression of pancreatic glucose transporter 2 in pancreatic  $\beta$  cells* J. Endocrinol. Invest., **37**, 667–673

## Insulin secretion

- Buchanan, C.M.**, Phillips, A.R.J. and Cooper, G.J.S. (2001) *Preptin derived from proinsulin growth factor II (preIGF-II) is secreted from pancreatic islet  $\beta$ -cells and enhances insulin secretion* Biochem. J., **360**, 431-439
- Cao, D-S.**, Zhong, L., Hsieh, T-h., Abooj, M., Bishnoi, M., Hughes, L. and Premkumar, L.S. (2012) *Expression of transient receptor potential ankyrin 1 (TRPA1) and its role in insulin release from rat pancreatic beta cells* PLoS One, **7**: e38005
- Suckow, A.T.**, Comoletti, D., Waldrop, M., Mosedale, M., Egodage, S., Taylor, P. and Chessler, S.D. (2008) *Expression of neurexin, neuroligin, and their cytoplasmic binding partners in the pancreatic  $\beta$ -cells and the involvement of neuroligin in insulin secretion* Endocrinology, **149**, 6006-6017
- Sweet, I.R.**, Khalil, G., Wallen, A.R., Steedman, M., Schenkman, K.A., Reems, J.A., Kahn, S.E. and Callis, J.B. (2002) *Continuous measurement of oxygen consumption by pancreatic islets* Diabetes Technol. Therapeut., **4**, 661-672
- Zang, X-L.**, Yang, J-K., Yu, M. and Xue, G-F. (2009) *Improved, low-cost methods for pancreatic islet purification in rats* Transplant. Proc., **41**, 4297-4301

## Mitochondrial function

- Sweet, I.R.**, Cook, D.L., DeJulio, E., Wallen, A.R., Khalil, G., Callis, J. and Reems, J-A. (2004) *Regulation of ATP/ADP in pancreatic islets* Diabetes, **53**, 401-409
- Sweet, I.R.**, Gilbert, M., Jensen, R., Sabek, O., Fraga, D.W., Gaber, A.O. and Reems, J. (2005) *Glucose stimulation of cytochrome C reduction and oxygen consumption as assessment of human islet quality* Transplantation, **80**, 1003-1011
- Sweet, I.R.** and Gilbert, M. (2006) *Contribution of calcium influx in mediating glucose-stimulated oxygen consumption in pancreatic islets* Diabetes, **55**, 3509-3519

## PEG interaction

**Panza, J.L.**, Wagner, W.R., Rilo, H.L.R., Rao, R.H., Beckman, E.J. and Russell, A.J. (2000) *Treatment of rat pancreatic islets with reactive PEG* *Biomaterials*, **21**, 1155-1164

## Purification

**Dellé, H.**, Saito, M.H., Yoshimoto, P.M. and Noronha, I.L. (2007) *The use of iodixanol for the purification of rat pancreatic islets* *Transplant. Proc.*, **39**, 467-469

**Sawada, T.**, Matsumoto, I., Nakano, M., Kirchof, N., Sutherland, D.E.R. and Hering, B.J. (2003) *Improved islet yield and function with ductal injection of university of Wisconsin solution before pancreas preservation* *Transplantation*, **75**, 1965-1969

## RNA

**Derr, A.**, Yang, C., Zilionis, R., Sergushichev, A., Blodgett, D.M., Redick, S., Bortell, R., Luban, J., Harlan, D.M., Kadener, S. et al (2016) *End Sequence Analysis Toolkit (ESAT) expands the extractable information from single-cell RNA-seq data* *Genome Res.*, **26**, 1397-1410

**Kiba, T.**, Tanemura, M. and Yagyu, K. (2013) *High-quality RNA extraction from rat pancreatic islet* *Cell Biol. Int. Rep.*, **9999**, 1-4

## Review articles

**Bellin, M.D.** and Sutherland, D.E.R. (2010) *Pediatric islet autotransplantation: indication, technique and outcome* *Curr. Diab. Rep.*, **10**, 326-331

**Chhabra, P. et al** (2014) *Overcoming barriers in clinical islet transplantation: Current limitations and future prospects* *Curr. Probl. Surg.*, **51**, 49-86

**Gaglia, J.L.**, Shapiro, A.M.J. and Weir, G.C. (2005) *Islet transplantation: progress and challenge* *Arch. Med. Res.*, **36**, 273-280

**Hawthorne, W.J.**, Williams, L. and Chew, Y.V. (2016) *Clinical islet isolation* In *Pancreatic Islet Isolation, Advances in Experimental Medicine and Biology* (ed © Ramírez-Domínguez, M.) Springer International Publishing Switzerland, pp 89-122

**Ikemoto, T.**, Noguchi, H., Shimoda, M., Naziruddin, B., Jackson, A., Tamura, Y., Fujita, Y., Onaca, N., Levy, M.F. and Matsumoto, S. (2009) *Islet cell transplantation for the treatment of type 1 diabetes in the USA* *J Hepatobiliary Pancreat. Surg.*, **16**, 118-123

**Kandeel, F.**, Smith, C.V., Todorov, I. and Mullen, Y (2003) *Advances in islet cell biology. From stem cell differentiation to clinical transplantation: conference report* *Pancreas*, **27**, e63-e78

**Langer, R.M.** (2010) *Islet transplantation: lessons learned since the Edmonton breakthrough* *Transplant. Proc.*, **42**, 1421-1424

**Liu, E.H.** and Harlan, D.M. (2008) *Islet cell transplantation. How effective is it?* In *Contemporary Endocrinology: Controversies in Treating Diabetes: Clinical and Research Aspects* (ed. LeRoith, D. and Vinik, A.I.), Humana Press, Totowa, NJ, pp. 11-32

**McCall, M.** and Shapiro, A.M.J. (2014) *Islet cell transplantation* *Semin. Pediatr. Surg.*, **23**, 83-90

**Matsumoto, S.** (2010) *Islet cell transplantation for Type 1 diabetes* *J. Diabetes* **2** (2010) 16-22

**Matsumoto, S.** (2011) *Autologous islet cell transplantation to prevent surgical diabetes* *J. Diabetes*, **3**, 328-336

**Onaca, N.**, Naziruddin, B., Matsumoto, S., Noguchi, H., Klintmalm, G.B. and Levy, M.F. (2007) *Pancreatic islet cell transplantation: update and new developments* *Nutr. Clin. Pract.*, **22**, 485-493

**Rafati, S.**, Le, C., Rajotte, R.V. and Rayat, G.R. (2012) *Cell separation, perfusion from tissue, organelle fractionation: A comparison of the methods used for porcine islet isolation for transplantation as a treatment for type 1 diabetes mellitus* In *Comprehensive Sampling and Sample Preparation, Vol. 3, Extraction Techniques and Applications: Biological/Medical and Environmental/Forensics*, Elsevier Inc., pp 33-51

**Soria, B.**, Hmadcha, A., Bedoya, F.J. and Tejedro, J.R. (2007) *Generation of islets from stem cells* *Principles of Tissue Engineering*, 3<sup>rd</sup> edition (ed. Lanza, R., Langer, R. and Vacanti, P.) Elsevier, Inc., pp605-618

**Shapiro, A. M. J.** (2003) *Islet transplants and impact on secondary diabetic complications: does C-peptide protect the kidney* *J. Am. Soc. Nephrol.*, **14**, 2214-2216

**Shapiro, A.M.J.**, Nani, S. and Lakey, J.R.T. (2003) *Clinical islet transplant: current and future directions towards tolerance* *Immunol. Rev.*, **96**, 219-236

**Shapiro, A.M.J.** and Ricordi, C. (2004) *Unraveling the secrets of single donor success in islet transplantation* *Am. J. Transplant.*, **4**, 295-298

**Stevens, R.B.**, Matsumoto, S. and Marsh, C. (2001) *Is islet transplantation a realistic therapy for the treatment of type 1 diabetes in the near future?* *Clin. Diabetes*, **19**, 51-60

**Ulrichs, K.**, Eber, S., Schneiker, B., Gahn, S., Strauß, A., Moskalenko, V. and Chodnevsckaja, I. (2012) *Isolation of porcine pancreatic islets for xenotransplantation* In Xenotransplantation: Methods and Protocols, Methods Mol. Biol., **885** (ed. Costa, C. and Máñez, R.), Springer Science+Business Media, LLC, pp 213-232  
**White, S.A.**, James, R.F.L., Swift, S.M., Kimber, R.M. and Nicholson, M.L. (2001) *Human islet cell transplantation – future prospects* Diabet. Med., **18**, 78-103

Mini-Review MC05; 4<sup>th</sup> edition, October 2017

**Alere Technologies AS**

Axis-Shield Density Gradient Media  
is a brand of Alere Technologies AS