

OptiPrep™ Mini-Review MC05

Purification of pancreatic islets – a bibliography

The reference list has been divided alphabetically into the species source of the islets ([human, see p1](#); [murine see p7](#); [porcine see p9](#), [primate \(non-human\) see p14](#); [rat see p14](#)) and 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 pp15-16.](#)

- ◆ 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.
- ◆ This OptiPrep™ Application Sheet may be accessed from the Index of the “Mammalian and non-mammalian cells” file either on the OptiPrep™ Applications flash-drive or from the following website: www.axis-shield-density-gradient-media.com (click on “Methodology”).

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., Hering, B.J., Radosevich, D.M., Moran, A. and Sutherland, D.E.R. (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., Rahman, A.M., Onaca, N., Naziruddin, B. and Levy, M.F. (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

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

[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 β -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., Khan, A., Miyagawa, S., Pileggi, A., Inverardi, L., Alejandro, R., Hering, B.J. and Ichii, H. (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., Naziruddin, B., Purcell, K., Onaca, N. and Levy, M.F. (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., Millis, J.M., Matthews, J.B. and Witkowski, P. (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 1 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., Sageshima, J., Nakano, M., Sawada, T., Matsumoto, I., Zhang, H.J., Sutherland, D.E.R. and Bluestone, J.A. (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., Kobayashi, N., Onaca, N., Levy, M.F. and Matsumoto, S. (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., Peng, H., Sugimoto, K., Itoh, T., Kobayashi, N., Onaca, N., Levy, M.F. and Matsumoto, S. (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., Kobayashi, N., Onaca, N., Levy, M.F. and Matsumoto, S. (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., Miyakawa, S., Shiraki, R., Hoshinaga, K. and Tanaka, K. (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 pancreatotomy 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., Zhang, H-J., Parkey, J., Hunter, D.W. and Sutherland, D.E.R. (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., Bansal-Pakala, P., Balamurugan, A.N., Papas, K., Sutherland, D.E.R., Moran, A. and Hering, B.J. (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., Fekman, 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., Sageshima, J., Nakano, M., Sawada, T., Matsumoto, I., Zhang, H.J., Sutherland, D.E.R. and Bluestone, J.A. (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., Khan, A., Miyagawa, S., Pileggi, A., Inverardi, L., Alejandro, R., Hering, B.J. and Ichii, H. (2010) *Antipro-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., Rahman, A., Purcell, K., Naziruddin, B., Onaca, N. and Levy, M.F. (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., Miyakawa, S., Shiraki, R., Hoshinaga, K. and Tanaka, K. (2006) *Procurement of the human pancreas for pancreatic islet transplantation from marginal cadaver donors* Transplantation, **82**, 327-331

Yield/viability/function

β -cell proliferation

Purwana, I., Zheng, J., Li, X., Deurloo, M., Son, D.O., Zhang, Z. et al (2014) *GABA promotes human β -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 β -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- β 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., Kobayashi, N., Onaca, N., Levy, M.F. and Matsumoto, S. (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., Peng, H., Sugimoto, K., Itoh, T., Kobayashi, N., Onaca, N., Levy, M.F. and Matsumoto, S. (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., Papas, K.K., Beilman, G.J., Hering, B.J. and Sutherland, D.E.R./ (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 pancreatotomy 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 transplants* Transplantation, **78**, 880-885

Matsumoto, S., Okitsu, T., Iwanaga, Y., Noguchi, H., Nagata, H., Yonekawa, Y., Yamada, Y., Fukuda, K., Shibata, T., Kasai, Y., Maekawa, T., Wada, H., Nakamura, T. and Tanaka, K. (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., Fujita, Y., Chujo, D., Takita, M., Kobayashi, N., Onaca, N. and Levy, M. (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., Yuasa, T., Tiwari, M., Papas, K.K., McCarthy, R., Sutherland, D.E.R. and Hering, B.J. (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 β -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 /allotransplantation* Transplantation, **91**, 508–51

Mita, A., Ricordi, C., Messinger, S., Miki, A., Misawa, R., Barker, S., Molano, R.D., Haertter, R., Alvarez, A., Khan, A., Pileggi, A., Miyagawa, S., Inverardi, L., Ichii, H. (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., Kobayashi, N., Onaca, N., Levy, M.F. and Matsumoto, S. (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., Itoh, T., Kobayashi, N., Onaca, N., Levy, M.F. and Matsumoto, S. (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 β and TNF- α blockage

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 β and TNF- α* 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., Balamurugan, A.N., Wilhelm, J.J., Hering, B.J., Sutherland, D.E.R., Moran, A. and Bellin, M.D. (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., Ueda, M., Hatanaka, N., Miyakawa, S., Kobayashi, N. and Song, C. (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., Shibata, T., Kasai, Y., Maekawa, T., Wada, H., Nakamura, T. and Tanaka, K. (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., Olsen, G.S., Sugimoto, K., Itoh, T., Onaca, N., Levy, M.F., Grayburn, P.A. and Matsumoto, S. (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

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 β and TNF- α* 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

Apoptotic ER signals

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 β -cell failure and diabetes in mice with a deletion mutation of the endoplasmic reticulum molecular chaperone gene P58^{oIPK}* Diabetes, **54**, 1074-1081

β 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 β -cell failure and diabetes in mice with a deletion mutation of the endoplasmic reticulum molecular chaperone gene P58^{oIPK}* 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 β -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 P2Y13 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 P2Y6 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

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., Harlan, D.M., Lubensky, I.A., Schmidt, L.S., Linehan, W.M. and Libutti, S.K. (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 β -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., Ito, T., Nagano, H., Mori, M., Doki, Y. and Sawa, Y. (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., Marubashi, S., Eguchi, H., Takeda, Y., Matsuura, N., Ito, T., Nagano, H., Doki, Y. and Mori, M. (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 β -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., Kang, B.H., Park, S.P., Bae, Y., Yoon, I-H., Kim, Y-H., Lee, J-I., Kim, J.S., Shin, J-S., Yang, J., Kim, S.J., Rostlund, E., Muller, W.A. and Park, S.H. (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 CD4⁺ and CD8⁺ 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

Rijkkelijkhuizen, 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

Rijkkelijkhuizen, 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 xenogeneic 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., Moskalenko, V., Amselgruber, W., Göke, B., Pfeifer, A., Wanke, R. and Wolf, E. (2010)

Glucose intolerance and reduced proliferation of pancreatic β -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 β -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., Ha, J., Kim, S.J. Park, K.S. (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 β -cell function in porcine islet transplantation* Cell Transplant., **11**, 721-728

Rijkkelijkhuizen, 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., Lee, C.T., Kim, S-J. and Park, C-G. (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 β -cell function

Pakhomov, O., Honiger, J., Gouin, E., Cariolet, R., Reach, G. and Darquy, S (2002) *Insulin treatment of mice recipients preserves β -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., Kang, B.H., Park, S.P., Bae, Y., Yoon, I-H., Kim, Y-H., Lee, J-I., Kim, J.S., Shin, J-S., Yang, J., Kim, S.J., Rostlund, E., Muller, W.A. and Park, S.H. (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., Suh, P-G., Ryu, S.H., Kim, J-E., Bang, K., Hwang, J-I., Yang, J., Park, K.W., Chung, J. and Ahn, C. (2008) *Hydrogen peroxide-induced VCAM-1 expression in pancreatic islets and β -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

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 Lembert, 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

Lembert, 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

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., Shibata, T., Kasai, Y., Maekawa, T., Wada, H., Nakamura, T. and Tanaka, K. (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 Matsumoto, 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., Kim, S.J., Lee, H.K., Ahn, C. and Park, K.S. (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., Sugimoto, K., Itoh, T., Kobayashi, N., Ueda, M., Okitsu, T., Iwanaga, Y., Nagata, H., Liu, X., Kamiya, H., Onaca, N., Levy, M.F. and Matsumoto, S. (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 α 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., Sutherland, D.E.R., McCarthy, R.C., Hering, B.J. and Balamurugan, A.N. (2011) *Successful isolation and transplantation of nonhuman primate islets using a novel purified enzyme blend* Transplantation, **92**, e41-e42
- 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
- Sasikala, M.**, Rao, G.V., Vijayalakshmi, V., Pradeep, R., Pothani, S., Kumar, P.P., Gaddipati, R., Sirisha, G., Cheemalakonda, R., Tandan, M., Subramanyam, C., Vasudevan, S. and Reddy, D.N. (2013) *Long-term functions of encapsulated islets grafted in nonhuman primates without immunosuppression* Transplantation, **96**, 624-632

Rat

Allografts

- Dellè, 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

β 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 β -cell imaging agents* Biochem. Biophys. Res. Commun., **314**, 976-983

Ca²⁺ 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 β -cells* Am. J. Physiol. Endocrinol. Metab., **297**, E717–E727
- Moustafa, A.** and Habara, Y. (2016) *Reciprocal interaction among gasotransmitters in isolated pancreatic β -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

- 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 γ -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 rat pancreatic β 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 β -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 β -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 Techn. 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

Dellê, 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., Kirchhof, 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 Tejedo, J.R. (2007) *Generation of islets from stem cells* Principles of Tissue Engineering, 3rd 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.**, Nanij, 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 Chodnevskaja, 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; 3rd edition, November 2016

Alere Technologies AS

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