

References

- [1] M.R. Taskinen, "Diabetic dyslipidemia," *Atherosclerosis-Supplement*, **3**(2002)47-51
- [2] A. Ceriello, "Postprandial hyperglycemia and diabetes complications," *Diabetes*, **54**(2005)1-7
- [3] S.H. Golden, and T. Sapir, "Methods for insulin delivery and glucose monitoring in diabetes: summary of a comparative effectiveness review," *Journal of Managed Care & Specialty Pharmacy*, **18**(2012)S1-17
- [4] J.F. Tanti, and J. Jager, "Cellular mechanisms of insulin resistance: role of stress-regulated serine kinases and insulin receptor substrates (IRS) serine phosphorylation," *Current Opinion in Pharmacology*, **9**(2009)753-762
- [5] W. Tang, S. Li, Y. Liu, M.T. Huang, and C.T. Ho, "Antidiabetic activity of chemically profiled green tea and black tea extracts in a type 2 diabetes mice model via different mechanisms," *Journal of Functional Foods*, **5**(2013)1784-1793
- [6] K. Srinivasan, B. Viswanad, L. Asrat, C.L. Kaul, and P. Ramarao, "Combination of high-fat diet-fed and low-dose streptozotocin-treated rat: a model for type 2 diabetes and pharmacological screening," *Pharmacological Research*, **52**(2005)313-320
- [7] A. Lim, "Diabetic nephropathy - complications and treatment," *International Journal of Nephrology and Renovascular Disease*, **7**(2014)361-381
- [8] R. Takayanagi, T. Inoguchi, and K. Ohnaka, "Clinical and experimental evidence for oxidative stress as an exacerbating factor of diabetes mellitus," *Journal of Clinical Biochemistry and Nutrition*, **48**(2011)72-77
- [9] D. Wu, W. Wen, C.L. Qi, R.X. Zhao, J.H. Lu, C.Y. Zhong, et al., "Ameliorative effect of berberine on renal damage in rats with diabetes induced by high-fat diet and streptozotocin," *Phytomedicine*, **19**(2012)712-718
- [10] H.Y. Hung, K. Qian, S.L. Morris-Natschke, C.S. Hsu, and K.H. Lee, "Recent discovery of plant-derived anti-diabetic natural products," *Natural Product Reports*, **29**(2012)580-606
- [11] G. Philomena, "Concerns regarding the safety and toxicity of medicinal plants – an overview," *Journal of Applied Pharmaceutical Science*, **1**(2011)40-44

- [12] C. Bodeker, G. Bodeker, C.K. Ong, C.K. Grundy, G. Burford, and K. Shein, WHO Global Atlas of Traditional, Complementary and Alternative Medicine, World Health Organization, Geneva, Switzerland, 2005.
- [13] M. Ekor, “The growing use of herbal medicines: issues relating to adverse reactions and challenges in monitoring safety,” *Frontiers in Pharmacology*, **4**(2014)177
- [14] N. Vasavada, and R. Agarwal, “Role of oxidative stress in diabetic nephropathy,” *Advances in Chronic Kidney Disease*, **12**(2005)146–154
- [15] S.L. Habib, “Diabetes and renal tubular cell apoptosis,” *World Journal of Diabetes*, **4**(2013)27–30
- [16] M. Raish, A. Ahmad, B.L. Jan, K.M. Alkharfy, M.A. Ansari, K. Mohsin, et al., “Momordica charantia polysaccharides mitigate the progression of STZ induced diabetic nephropathy in rats,” *International Journal of Biological Macromolecules*, **91**(2016)394–399
- [17] H. Wang, H. Zhang, X. Chen, T. Zhao, Q. Kong, M. Yan, et al., “The decreased expression of electron transfer flavoprotein beta is associated with tubular cell apoptosis in diabetic nephropathy,” *International Journal of Molecular Medicine*, **37**(2016)1290–1298
- [18] Y.H. Hong, *Oriental Materia Medica: A Concise Guide*, Oriental Healing Arts Institute, Long Beach, CA, USA, 1986.
- [19] C.S. Lu, M.H. Yin, Y.H. Huang, C. Pao, and C.F. Sung, “*Radix salviae miltiorrhizae* and *Rhizoma ligustici wallichii* in coronary heart disease,” *Chinese Medical Journal (English)*, **4**(1978)43–46
- [20] Y.P. Liu, H. Cao, G.R. Han, H. Fushimi, and K. Komatsu, “matK and its nucleotide sequencing of crude drug chuanxiong and phylogenetic relationship between their species from China and Japan,” *Yao Xue Xue Bao*, **37**(2002)63–68
- [21] X. Xiao, Y. Liu, C. Qi, F. Qiu, X. Chen, J. Zhang, and P. Yang, “Neuroprotection and enhanced neurogenesis by tetramethylpyrazine in adult rat brain after focal ischemia,” *Neurological Research*, **32**(2010)547–555
- [22] Y.X. Yan, J.X. Zhao, S. Han, N.J. Zhou, Z.Q. Jia, S.J. Yao, et al., “Tetramethylpyrazine induces SH-SY5Y cell differentiation toward the neuronal phenotype through activation of the PI3K/Akt/Sp1/TopoII β pathway,” *European Journal of Cell Biology*, (2015), <http://dx.doi.org/10.1016/j.ejcb.2015.09.001>.

- [23] Y. Kang, M. Hu, Y. Zhu, X. Gao, and M.W. Wang, "Antioxidative effect of the herbal remedy Qin Huo Yi Hao and its active component tetramethylpyrazine on high glucose-treated endothelial cells," *Life Sciences*, **84**(2009)428-436
- [24] J.P. Whitehead, S.F. Clark, B. Urso, and D.E. James, "Signalling through the insulin receptor," *Current Opinion in Cell Biology*, **12**(2000)222-228
- [25] A.R. Saltiel, and C.R. Kahn, "Insulin signalling and the regulation of glucose and lipid metabolism," *Nature*, **414**(2001)799-806
- [26] C.B. Dugani, V.K. Randhawa, A.W. Cheng, N. Patel, and A. Klip, "Selective regulation of the perinuclear distribution of glucose transport 4 (GLUT4) by insulin signals in muscle cells," *European Journal of Cell Biology*, **87**(2008)337-351
- [27] M. Cormont, J.F. Tanti, A. Zahraoui, E. Van Obberghen, A. Tavitian, and Y.L. Marchand-Brustel, "Insulin and okadaic acid induce Rab4 redistribution in adipocytes," *Journal of Biological Chemistry*, **268**(1993)19491-19497
- [28] R.K. Patel, and C. Mohan, "PI3K/AKT signaling and systemic autoimmunity," *Immunologic Research*, **31**(2005)47-55
- [29] M.J. Rane, Y. Song, S. Jin, M.T. Barati, R. Wu, H. Kausar, et al., "Interplay between Akt and p38 MAPK pathways in the regulation of renal tubular cell apoptosis associated with diabetic nephropathy," *American Journal of Physiology-Renal Physiology*, **298**(2010)F49-F61
- [30] F. Giacco, and M. Brownlee, "Oxidative stress and diabetic complications," *Circulation Research*, **107**(2010)1058-1070
- [31] M. Kitada, D. Koya, T. Sugimoto, M. Isono, S. Araki, A. Kashiwagi, et al., "Translocation of glomerular p47phox and p67phox by protein kinase C-beta activation is required for oxidative stress in diabetic nephropathy," *Diabetes*, **52**(2003)2603-2614
- [32] G. Wolf, and F.N. Ziyadeh, "Cellular and molecular mechanisms of proteinuria in diabetic nephropathy," *Nephron Physiology*, **106**(2007)26-31
- [33] Q.H. Yang, Y. Liang, Q. Xua, Y. Zhanga, L. Xiaoa, and L.Y. Si, "Protective effect of tetramethylpyrazine isolated from *Ligusticum chuanxiong* on nephropathy in rats with streptozotocin-induced diabetes," *Phytomedicine*, **18**(2011)1148-1152
- [34] A.C. Maritim, R.A. Sanders, and J.B. Watkins, "Diabetes, oxidative stress, and antioxidants: a review," *Journal of Biochemical and Molecular Toxicology*, **17**(2003)24-38

- [35] S.R. Joshi, R.M. Parikh, and A.K. Das, "Insulin-history, biochemistry, physiology and pharmacology," *Journal of the Association of Physicians of India*, **55**(2007)19
- [36] E. Loghmani, "Diabetes Mellitus: Type 1 and Type 2," J. Stang and M. Story (Eds.), *Guidelines for Adolescent Nutrition Services 2005*, 2005.
- [37] V.A. Kangralkar, S.D. Patil, and R.M. Bandivadekar, "Oxidative stress and diabetes: a review," *International Journal of Pharmaceutical Applications*, **1**(2010)38–45
- [38] American Diabetes Association, "Diagnosis and classification of diabetes," *Diabetes Care*, **27**(2004)S5–S10
- [39] J.C. Ozougwu, K.C. Obimba, C.D. Belonwu, and C.B. Unakalamba, "The pathogenesis and pathophysiology of type 1 and type 2 diabetes mellitus," *Journal of Physiology and Pathophysiology*, **4**(2013)46–57
- [40] R.G. Gill, and K. Haskins, "Molecular mechanisms underlying diabetes and other autoimmune diseases," *Immunology Today*, **14**(1993)49–51
- [41] J.C. Michael, M.C. James, Robbins, and K. Vinay, The pancreas, In: *Pathologic Basis of Disease*, sixth edition, Harcourt Publisher, 2000, pp. 902–929.
- [42] R.A. DeFronzo, Lily, and E. Ferrannini, "Lecture 1987, the triumvirate: beta cell, muscle, liver. A collusion responsible for NIDDM," *Diabetes*, **37**(1988)667–687
- [43] D.A. Pyke, "Diabetes: the genetic connections," *Diabetologia*, **17**(1979)333–343
- [44] H. Unoki, A. Takahashi, T. Kawaguchi, et al., "SNPs in KCNQ1 are associated with susceptibility to type 2 diabetes in East Asian and European populations," *Nature Genetics*, **40**(2008)1098–1102
- [45] M.A. Abdul-Ghani, M. Matsuda, R. Jani, et al., "The relationship between fasting hyperglycemia and insulin secretion in subjects with normal or impaired glucose tolerance," *American Journal of Physiology-Endocrinology and Metabolism*, **295**(2008)E401–E406
- [46] M. Matsuda, and R.A. DeFronzo, "Insulin sensitivity indices obtained from oral glucose tolerance testing: comparison with the euglycemic insulin clamp," *Diabetes Care*, **22**(1999)1462–1470
- [47] J.L. Chiasson, R.G. Josse, R. Gomis, et al., "Acarbose for prevention of type 2 diabetes mellitus: the STOPNIDDM randomised trial," *Lancet*, **359**(2002)2072–2077

- [48] R.M. Anjana, M.K. Ali, R. Pradeepa, M. Deepa, M. Datta, R. Unnikrishnan, et al., "The need for obtaining accurate nationwide estimates of diabetes prevalence in India - rationale for a national study on diabetes," *Indian Journal of Medical Research*, **133**(2011)369-380
- [49] V. Mohan, M. Deepa, R. Deepa, C.S. Shanthirani, S. Farooq, A. Ganesan, et al., "Secular trends in the prevalence of diabetes and impaired glucose tolerance in urban South India--the Chennai Urban Rural Epidemiology Study (CURES-17)," *Diabetologia*, **49**(2006)1175-1178
- [50] V. Mohan, C.S. Shanthirani, M. Deepa, R. Deepa, R.I. Unnikrishnan, and M. Datta, "Mortality rates due to diabetes in a selected urban south Indian population--the Chennai Urban Population Study [CUPS--16]," *Journal of the Association of Physicians of India*, **54**(2006)113-117
- [51] M. Rema, S. Premkumar, B. Anitha, R. Deepa, R. Pradeepa, and V. Mohan, "Prevalence of diabetic retinopathy in urban India: the Chennai Urban Rural Epidemiology Study (CURES) eye study, I," *Investigative Ophthalmology & Visual Science*, **46**(2005)2328-2333
- [52] R.I. Unnikrishnan, M. Rema, R. Pradeepa, M. Deepa, C.S. Shanthirani, R. Deepa, et al., "Prevalence and risk factors of diabetic nephropathy in an urban South Indian population: the Chennai Urban Rural Epidemiology Study (CURES 45)," *Diabetes Care*, **30**(2007)2019-2024
- [53] A. Ramachandran, C. Snehalatha, K. Satyavani, E. Latha, R. Sasikala, and V. Vijay, "Prevalence of vascular complications and their risk factors in type 2 diabetes," *Journal of the Association of Physicians of India*, **47**(1999)1152-1156
- [54] R. Pradeepa, M. Rema, J. Vignesh, M. Deepa, R. Deepa and V. Mohan, "Prevalence and risk factors for diabetic neuropathy in an urban south Indian population: the Chennai Urban Rural Epidemiology Study (CURES-55)," *Diabetic Medicine*, **25**(2008)407-412
- [55] J.I. Wallace, "Management of diabetes in the elderly," *Clinical Diabetes*, **17**(1999)1
- [56] H. Mohan, Textbook of Pathology, fourth edition, Jaypee publishers, New Delhi, India, 2002.
- [57] J. Zhang, J. Liu, and X. Qin, "Advances in early biomarkers of diabetic nephropathy," *Revista da Associação Médica Brasileira*, **64**(2018)85–92

- [58] C. Magee, D.J. Grieve, C.J. Watson, and D.P. Brazil, "Diabetic nephropathy: a tangled web to unweave," *Cardiovascular Drugs and Therapy*, **31**(2017)579–592
- [59] N. Papadopoulou-Marketou, S.A. Paschou, N. Marketos, S. Adamidi, S. Adamidis, and C. Kanaka-Gantenbein, "Diabetic nephropathy in type 1 diabetes," *Minerva Medica*, **109**(2018)218–228
- [60] R.G. Nelson, P.H. Bennett, G.J. Beck, et al., "Diabetic Renal Disease Study Group: development and progression of renal disease in Pima Indians with non-insulin dependent diabetes mellitus," *New England Journal of Medicine*, **335**(1996)1636–1642
- [61] T.W. Tervaert, A.L. Mooyaart, K. Amann, A.H. Cohen, H.T. Cook, C.B. Drachenberg, et al., "Pathologic classification of diabetic nephropathy," *Journal of the American Society of Nephrology*, **21**(2014)556–563
- [62] O. Gheith, N. Farouk, N. Nampoory, M.A. Halim, and T. Al-Otaibi, "Diabetic kidney disease: world wide difference of prevalence and risk factors," *Journal of Nephro pharmacology*, **5**(2016)49–56
- [63] E.J. Weil, K.V. Lemley, C.C. Mason, et al., "Podocyte detachment and reduced glomerular capillary endothelial fenestration promote kidney disease in type 2 diabetic nephropathy," *Kidney International*, **82**(2012)1010–1017
- [64] M. Toyoda, B. Najafian, Y. Kim, M.L. Caramori, and M. Mauer, "Podocyte detachment and reduced glomerular capillary endothelial fenestration in human type 1 diabetic nephropathy," *Diabetes*, **56**(2007)2155–2160
- [65] M. Haneda, S. Araki, M. Togawa, T. Sugimoto, M. Isono, and R. Kikkawa, "Mitogen-activated protein kinase cascade is activated in glomeruli of diabetic rats and glomerular mesangial cells cultured under high glucose conditions," *Diabetes*, **46**(1997)847–853
- [66] J.R. Williamson, K. Chang, M. Frangos, et al., "Hyperglycemic pseudohypoxia and diabetic complications," *Diabetes*, **42**(1993)801–813
- [67] M.A. Lanaspa, T. Ishimoto, C. Cicerchi, et al., "Endogenous fructose production and fructokinase activation mediate renal injury in diabetic nephropathy," *Journal of the American Society of Nephrology*, **25**(2014)2526–2538
- [68] H. Xu, D.Z. Shi, and C.Y. Guan, "Clinical application and pharmacological actions of ligustrazine," *Chinese Journal of Integrative Medicine*, **23**(2003)376–379

- [69] P.K. Pang, J.J. Shan, and K.W. Chiu, "Tetramethylpyrazine, a calcium antagonist," *Planta Medica*, **62**(1996)431–435
- [70] Z. Yang, Q. Zhang, J. Ge, and Z. Tan, "Protective effects of tetramethylpyrazine on rat retinal cell cultures," *Neurochemistry International*, **52**(2008)1176–1187
- [71] Y. Tian, Y. Liu, X. Chen, H. Zhang, Q. Shi, J. Zhang, et al., "Tetramethylpyrazine promotes proliferation and differentiation of neural stem cells from rat brain in hypoxic condition via mitogen-activated protein kinases pathway in vitro," *Neuroscience Letters*, **474**(2010)26–31
- [72] J.Z. Hu, J.H. Huang, Z.M. Xiao, J.H. Li, X.M. Li, and H.B. Lu, "Tetramethylpyrazine accelerates the function recovery of traumatic spinal cord in rat model by attenuating inflammation," *Journal of the Neurological Sciences*, **324**(2013)94–99
- [73] Y. Ding, X. Hou, L. Chen, H. Li, Y. Tang, H. Zhou, et al., "Protective action of tetramethylpyrazine on the medulla oblongata in rats with chronic hypoxia," *Autonomic Neuroscience: Basic and Clinical*, **173**(2013)45–52
- [74] W. Wu, X. Yu, X.P. Luo, S.H. Yang, and D. Zheng, "Tetramethylpyrazine protects against scopolamine-induced memory impairments in rats by reversing the cAMP/PKA/CREB pathway," *Behavioural Brain Research*, **253**(2013)212–216
- [75] C.Y. Kwan, "Plant-derived drugs acting on cellular Ca²⁺ mobilization in vascular smooth muscle: tetramethylpyrazine and tetrandrine," *Stem Cells*, **12**(1994)64–67
- [76] E.A. Newsholme, and G. Dimitriadis, "Integration of biochemical and physiologic effects of insulin on glucose metabolism," *Experimental and Clinical Endocrinology & Diabetes*, **109**(2001)S122-S134
- [77] A. Ullrich, and J. Schlessinger, "Signal transduction by receptors with tyrosine kinase activity," *Cell*, **61**(1990)203-212
- [78] V. Baron, P. Kaliman, N. Gautier, and E. Van Obberghen, "The insulin receptor activation process involves localized conformational changes," *The Journal of Biological Chemistry*, **267**(1992)23290-23294
- [79] P. Manna, and S.K. Jain, "PIP3 but not PIP2 increases GLUT4 surface expression and glucose metabolism mediated by AKT/PKCzeta/lambda phosphorylation in 3T3L1 adipocytes," *Molecular and Cellular Biochemistry*, **381**(2013)291-299
- [80] M. Friedrichsen, J.B. Birk, E.A. Richter, R. Ribel-Madsen, C. Pehmoller, B.F. Hansen, et al., "Akt2 influences glycogen synthase activity in human skeletal muscle through regulation of NH(2)- terminal (sites 2 + 2a) phosphorylation,"

American Journal of Physiology-Endocrinology and Metabolism, **304**(2013)E631-E639

- [81] R. Sreedhar, S. Arumugam, R.A. Thandavarayan, V.V. Giridharan, V. Karuppagounder, V. Pitchaimani, et al., "Myocardial 14-3-3 η protein protects against mitochondria mediated apoptosis," *Cell Signaling*, **27**(2015)770–776
- [82] M. Kato, H. Yuan, Z.G. Xu, L. Lanting, S.L. Li, M. Wang, et al., "Role of the Akt/FoxO3a pathway in TGF-beta1-mediated mesangial cell dysfunction: a novel mechanism related to diabetic kidney disease," *Journal of the American Society of Nephrology*, **17**(2006)3325–3335
- [83] J. Zhou, W. Sun, H. Yoshitomi, L. Li, L. Qin, X. Guo, et al., "Qiwei granules alleviates podocyte lesion in kidney of diabetic KK-Ay mice," *BMC Complementary and Alternative Medicine*, **15**(2015)97
- [84] P. Masiello, C. Broca, R. Gross, M. Roye, M. Manteghetti, D. Hillaire-Buys, et al., "Development of a new model of type 2 diabetes in adult rats administered with streptozotocin and nicotinamide," *Diabetes*, **47**(1998)224
- [85] K.V. Routhu, N.E. Tsopanoglou, and J.L. Strande, "Parstatin (1-26): the putative signal peptide of protease-activated receptor 1 confers potent protection from myocardial ischemia-reperfusion injury," *Journal of Pharmacology and Experimental Therapeutics*, **332**(2010)898–905
- [86] R.C. Turner, R.R. Holman, D. Matthews, T.D.R. Hockaday, and J. Peto, "Insulin deficiency and insulin resistance interaction in diabetes: Estimation of their relative contribution by feedback analysis from basal plasma insulin and glucose concentrations," *Metabolism*, **28**(1979)1086–1096
- [87] S.S. Nayak, and T.N. Pattabiraman, "A new colorimetric method for the estimation of glycosylated haemoglobin," *Clinica Chimica Acta*, **109**(1981)267–274
- [88] P.Y. Martin, M. Bianchi, and F. Roger, "Arginine vasopressin modulates expression of neuronal NOS in rat renal medulla," *American Journal of Physiology-Renal Physiology*, **283**(2002)559–568
- [89] M.M. Bradford, "A rapid and sensitive method for the quantitation of microgram quantities of protein utilizing the principle of protein-dye binding," *Analytical Biochemistry*, **72**(1976)248–254
- [90] S.P. Pattanayak, and P.M. Mazumder, Histopathological approach to rat liver tissue, Protocol online: Your lab's reference book 1, 2008.

- [91] W.A. Border, S. Okuda, L.R. Languino, M.B. Sporn, and E. Ruoslahti, "Suppression of experimental glomerulonephritis by antiserum against transforming growth factor beta 1," *Nature*, **346**(1990)371–374
- [92] M. Matsumoto, T. Tanaka, T. Yamamoto, E. Noiri, T. Miyata, R. Inagi, et al., "Hypoperfusion of peritubular capillaries induces chronic hypoxia before progression of tubulointerstitial injury in a progressive model of rat glomerulonephritis," *Journal of the American Society of Nephrology*, **15**(2004)1574–1581
- [93] C.M. Steppan, S.T. Bailey, S. Bhat, E.J. Brown, R.R. Banerjee, C.M. Wright, et al., "The hormone resistin links obesity to diabetes," *Nature*, **409**(2001)307–312
- [94] K.F. Petersen, and G.I. Shulman, "Etiology of insulin resistance," *American Journal of Medicine*, **119**(2006)10–16
- [95] L. Zhang, J. Yang, X. Chen, K. Zan, H. Chen, Q. Wang, et al., "Antidiabetic and antioxidant effects of extracts from *Potentilla discolor* Bunge on diabetic rats induced by high fat diet and streptozotocin," *Journal of Ethnopharmacology*, **132**(2010)518–524
- [96] E. Krol, and Z. Krejpcio, "Evaluation of anti-diabetic potential of chromium (III) propionate complex in high-fat diet fed and STZ injected rats," *Food and Chemical Toxicology*, **49**(2011)3217–3223
- [97] V.P. Veerapur, K.R. Prabhakar, B.S. Thippeswamy, P. Bansal, K.K. Srinivasan, and M.K. Unnikrishnan, "Antidiabetic effect of *Ficus racemosa* Linn. stem bark in high-fat diet and low-dose streptozotocin-induced type 2 diabetic rats: a mechanistic study," *Food Chemistry*, **132**(2012)186–193
- [98] M.T. Pepato, R.H. Migliorini, A.L. Goldberg, and I.C. Kettelhut, "Role of different proteolytic pathways in degradation of muscle protein from streptozotocin-diabetic rats," *American Journal of Physiology-Endocrinology and Metabolism*, **271**(1996)E340–E347
- [99] M.R. Saha, P. Dey, I. Sarkar, D. De Sarker, B. Haldar, T.K. Chaudhuri, et al., "*Acacia nilotica* leaf improves insulin resistance and hyperglycemia associated acute hepatic injury and nephrotoxicity by improving systemic antioxidant status in diabetic mice," *Journal of Ethnopharmacology*, **210**(2018)275–286
- [100] E. Bonora, F. Saggiani, G. Targher, M.B. Zenere, M. Alberiche, T. Monauni, et al., "Homeostasis model assessment closely mirrors the glucose clamp technique in the assessment of insulin sensitivity – Studies in subjects with various degrees of glucose tolerance and insulin sensitivity," *Diabetes Care*, **23**(2000)57–63

- [101] M.J. Sampson, D.A. Hughes, M.J. Carrier, and I.R. Davies, "Status of HbA1c during acute hyperglycemia in type 2 diabetes," *Diabetes Care*, **25**(2002)537–541
- [102] A. Hassan, N. Tajuddin, and A. Shaikh, "Retrospective Case Series of Patients with Diabetes or Prediabetes Who Were Switched from Omega-3-Acid Ethyl Esters to Icosapent Ethyl," *Cardiology and Therapy*, **4**(2015)83–93
- [103] Y. Ding, Y. Li, and A. Wen, "Effect of niacin on lipids and glucose in patients with type 2 diabetes: A meta-analysis of randomized, controlled clinical trials," *Clinical Nutrition*, (2014), <http://dx.doi.org/10.1016/j.clnu.2014.09.019>.
- [104] G. Barbarossa, A. Renzi, L. D'Erasmus, A. Gallo, E. Grieco, M. Rossetti, et al., "The relation between glycemic control and HDL-C in type 2 diabetes: a preliminary step forward?," *Diabetes Research and Clinical Practice*, **104**(2014)E26–E28
- [105] J.C. Pickup, "Inflammation and activated innate immunity in the pathogenesis of type 2 diabetes," *Diabetes Care*, **27**(2004)813–823
- [106] B. Fève, and J.P. Bastard, "The role of interleukins in insulin resistance and type 2 diabetes mellitus," *Nature Reviews Endocrinology*, **5**(2009)305–311
- [107] Y. Han, H.W. Jung, and Y.K. Park, "Effects of icariin on insulin resistance via the activation of AMPK pathway in C2C12 mouse muscle cells," *European Journal of Pharmacology*, **758**(2015)60–63
- [108] Z. Song, Y. Guo, M. Zhou, and X. Zhang, "The PI3K/pAkt signaling pathway participates in calcitriol ameliorating podocyte injury in DN rats," *Metabolism*, **63**(2014)1324–1333
- [109] K.M. Kim, K.S. Lee, G.Y. Lee, H. Jin, E.S. Durrance, H.S. Park, et al., "Anti-diabetic efficacy of KICG1338, a novel glycogen synthase kinase-3 β inhibitor, and its molecular characterization in animal models of type 2 diabetes and insulin resistance," *Molecular and Cellular Endocrinology*, **409**(2015)1–10
- [110] C. Leloup, M. Arluison, N. Kassis, N. Lepetit, N. Cartier, P. Ferré, et al., "Discrete brain areas express the insulin-responsive glucose transporter GLUT4," *Brain Research Molecular Brain Research*, **38**(1996)45–53
- [111] C. Bouche, S. Serdy, C.R. Kahn, and A.B. Goldfine, "The cellular fate of glucose and its relevance in type 2 diabetes," *Endocrine Reviews*, **25**(2004)807–830
- [112] S. Gezginci-Oktayoglu, O. Sacan, S. Bolkent, Y. Ipci, L. Kabasakal, G. Sener, et al., "Chard (*Beta vulgaris* L. var. cicla) extract ameliorates hyperglycemia by

- increasing GLUT2 through Akt2 and antioxidant defense in the liver of rats,” *Acta Histochemica*, **116**(2014)32–39
- [113] G.R. Gandhi, A. Stalin, K. Balakrishna, S. Ignacimuthu, M.G. Paulraj, and R. Vishal, “Insulin sensitization via partial agonism of PPAR γ and glucose uptake through translocation and activation of GLUT4 in PI3K/p-Akt signalling pathway by embelin in type 2 diabetic rats,” *BBA General Subjects*, **1830**(2013)2243–2255
- [114] B. Satirapoj, and S.G. Adler, “Comprehensive approach to diabetic nephropathy,” *Kidney Research and Clinical Practice*, **33**(2014)121–131
- [115] Y. Gao, M. Zhang, T. Wu, M. Xu, H. Cai, and Z. Zhang, “Effects of D-Pinitol on Insulin Resistance through the PI3K/Akt Signaling Pathway in Type 2 Diabetes Mellitus Rats,” *Journal of Agricultural and Food Chemistry*, **63**(2015)6019–6026
- [116] D. Chen, D. Cao, and P. Sui, “Tetramethylpyrazine relieves LPS-induced pancreatic β -cell Min6 injury via regulation of miR-101/MKP-1,” *Artificial Cells, Nanomedicine, and Biotechnology*, **47**(2019)2545-2552
- [117] X. Xu, L. Wu, Z.Q. Lu, P. Xia, X.P. Zhu, and X. Gao, “Effects of tetramethylpyrazine phosphate on pancreatic islet microcirculation in SD rats,” *Journal of Endocrinological Investigation*, (2017), 10.1007/s40618-017-0748-1.
- [118] A.B. Bhatti, and M. Usman, “Drug targets for oxidative podocyte injury in diabetic nephropathy,” *Cureus*, **7**(2015)e393
- [119] X. Ji, C. Li, Y. Ou, N. Li, K. Yuan, G. Yang, et al., “Andrographolide ameliorates diabetic nephropathy by attenuating hyperglycemia-mediated renal oxidative stress and inflammation via Akt/NF- κ B pathway,” *Molecular and Cellular Endocrinology*, **S0303-7207**(2016)30231–30233
- [120] C. Soto, R. Recoba, H. Barron, C. Alvarez, and L. Favari, “Silymarin increases antioxidant enzymes in alloxan-induced diabetes in rat pancreas,” *Comparative Biochemistry and Physiology - Part C*, **136**(2003)205–212
- [121] A.L. Cao, L. Wang, X. Chen, Y.M. Wang, H.J. Guo, S. Chu, et al., “Ursodeoxycholic acid and 4-phenylbutyrate prevent endoplasmic reticulum stress-induced podocyte apoptosis in diabetic nephropathy,” *Laboratory Investigation*, **96**(2016)610–622
- [122] H. Zhang, T. Zhao, Y. Gong, X. Dong, W. Zhang, S. Sun, et al., “Attenuation of diabetic nephropathy by Chaihuang-Yishen granule through anti-inflammatory

- mechanism in streptozotocin-induced rat model of diabetes,” *Journal of Ethnopharmacology*, **151**(2014)556–564
- [123] B.D. Manning, and L.C. Cantley, “AKT/PKB signaling: navigating downstream,” *Cell*, **129**(2007)1261–1274
- [124] C. Ying, Y. Mao, L. Chen, S. Wang, H. Ling, W. Li, et al., “Bamboo leaf extract ameliorates diabetic nephropathy through activating the AKT signaling pathway in rats,” *International Journal of Biological Macromolecules*, **105**(2017)1587–1594