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The promise of zebrafish as a model of metabolic syndrome (Review) (Open Access)

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Abstract

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Metabolic syndrome is a cluster including hyperglycaemia, obesity, hypertension, and hypertriglyceridaemia as a result of biochemical and physiological alterations and can increase the risk of cardiovascular disease and diabetes. Fundamental research on this disease requires validated animal models. One potential animal model that is rapidly gaining in popularity is zebrafish (Danio rerio). The use of zebrafish as an animal model conveys several advantages, including high human genetic homology, transparent embryos and larvae that allow easier visualization. This review discusses how zebrafish models contribute to the development of metabolic syndrome studies. Different diseases in the cluster of metabolic syndrome, such as hyperglycaemia, obesity, diabetes, and hypertriglyceridaemia, have been successfully studied using zebrafish; and the model is promising for hypertension and cardiovascular metabolic-related diseases due to its genetic similarity to mammals. Genetic mutation, chemical induction, and dietary alteration are among the tools used to improve zebrafish models. This field is expanding, and thus, more effective and efficient techniques are currently developed to fulfil the increasing demand for thorough investigations. ©2019 Japanese Association for Laboratory Animal Science.

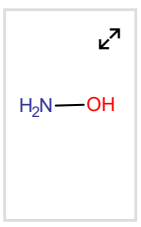
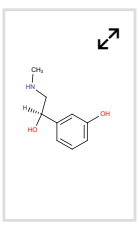
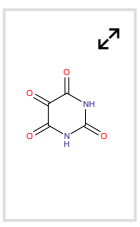
SciVal Topic Prominence

Topic: Zebrafish | Larva | Zebrafish model

Prominence percentile: 86.105

Chemistry database information

Substances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Author keywords

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(2019) Scientific Reports

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(2019) BioMed Research International

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Connaughton, V.P. , Baker, C. , Fonde, L.
(2016) Zebrafish

Diabetes | Hypertension | Metabolic syndrome | Obesity | Zebrafish

Indexed keywords

EMTREE drug terms:

acetyl coenzyme A carboxylase | acetylcholinesterase | agouti related protein | angiotensin II | apelin receptor | dipeptidyl carboxypeptidase | fatty acid synthase | glucose 6 phosphatase | glucose 6 phosphate dehydrogenase | glycogen phosphorylase | glycogen synthase | high density lipoprotein | monovalent cation | nitric oxide | phosphoenolpyruvate carboxylase | phosphopyruvate carboxylase | proopiomelanocortin | pyruvate kinase | serine/threonine protein kinase WNK1 | triacylglycerol

EMTREE medical terms:

biochemical analysis | body mass | cardiovascular disease | circadian rhythm | coiled body | diabetes mellitus | dietary pattern | environmental factor | gene mutation | gene overexpression | genetic similarity | genome-wide association study | glucose blood level | hyperglycemia | hypertriglyceridemia | insulin resistance | lipid diet | lipolysis | metabolic syndrome X | microalbuminuria | nonhuman | obesity | Panax notoginseng | polymerase chain reaction | Review | systolic blood pressure | zebra fish | animal | diabetes mellitus | disease model | hyperglycemia | hypertriglyceridemia | metabolic syndrome X | obesity

MeSH:

Animals | Diabetes Mellitus | Disease Models, Animal | Hyperglycemia | Hypertriglyceridemia | Metabolic Syndrome | Obesity | Zebrafish

Chemicals and CAS Registry Numbers:

acetyl coenzyme A carboxylase, 9023-93-2; acetylcholinesterase, 9000-81-1; angiotensin II, 11128-99-7, 68521-88-0; dipeptidyl carboxypeptidase, 9015-82-1; fatty acid synthase, 9045-77-6; glucose 6 phosphatase, 9001-39-2; glucose 6 phosphate dehydrogenase, 37259-83-9, 9001-40-5; glycogen phosphorylase, 9032-10-4; glycogen synthase, 9033-05-0; mammalian target of rapamycin complex 1; mammalian target of rapamycin complex 2; NIMA related kinase 1; nitric oxide, 10102-43-9; phosphoenolpyruvate carboxylase, 9067-77-0; phosphopyruvate carboxylase, 37341-54-1; proopiomelanocortin, 66796-54-1; pyruvate kinase, 9001-59-6; serine threonine protein kinase ULK1; serine/threonine protein kinase WNK1

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References (80)

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Zebrafish as a model for obesity and diabetes

Zang, L. , Maddison, L.A. , Chen, W.
(2018) Frontiers in Cell and Developmental Biology

Zebrafish: A model for understanding diabetic complications

Jörgens, K. , Hillebrands, J.-L. , Hammes, H.-P.
(2012) Experimental and Clinical Endocrinology and Diabetes

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