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Experimental models of metabolic and alcoholic fatty liver disease

Buyco DG *et al.* Metabolic and alcoholic liver disease models

Abstract

Non-alcoholic fatty liver disease (NAFLD) is a multi-systemic disease that is considered the hepatic manifestation of metabolic syndrome (MetS). Because alcohol consumption in NAFLD patients is common, there is a significant overlap in the pathogenesis of NAFLD and alcoholic liver disease (ALD). Indeed, MetS also significantly contributes to liver injury in ALD patients. This "syndrome of metabolic and alcoholic steatohepatitis" (SMASH) is thus expected to be a more prevalent presentation in liver patients, as the obesity epidemic continues. Several pre-clinical experimental models that couple

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These **animal** models are designed to simulate the clinical and **hepatocellular** features of human NAFLD/NASH. **8 Lack** of proper experimental models has hindered the investigation on pathogenic and therapeutic factors involved in fatty liver disease and the underlying liver metabolisms which lead to fat accumulation in the liver tissue. 9, 10

Cited by: 13**Author:** Hadi Emamat, Maryam Noori, Forough F...**Publish Year:** 2016

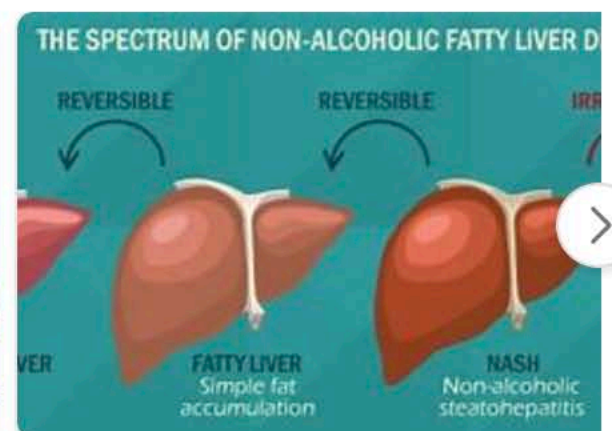
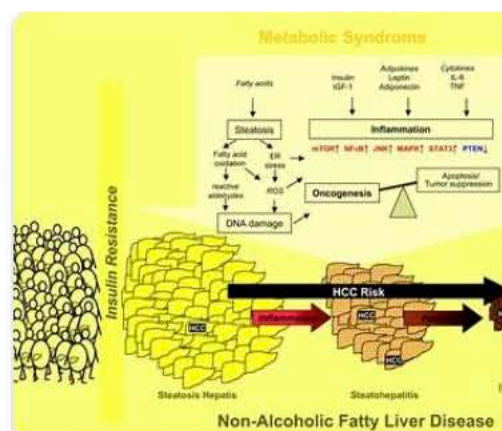
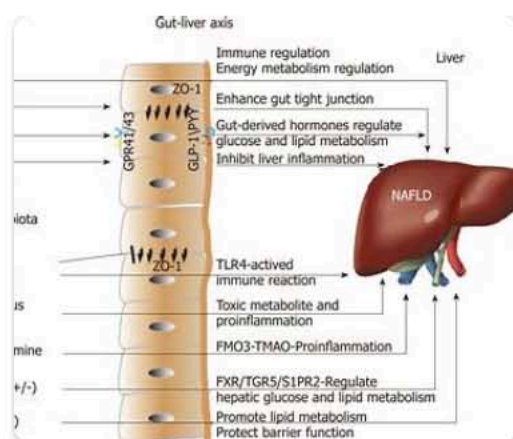
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NASH is a subset of a larger spectrum of **diseases** termed **fatty liver disease** (including **alcoholic** and nonalcoholic **fatty liver disease**; AFLD and NAFLD, respectively). NAFLD and NASH are linked to visceral adiposity, insulin resistance, dyslipidemia and type 2 diabetes, and are increasing due to the prevalence of the **metabolic** syndrome.

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An Accessible and Pragmatic Experimental Model of ...

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High fat diet induced models show the NAFLD/NASH associated metabolic abnormalities such as **obesity, insulin resistance, hyperglycemia, and dyslipidemia**; 8-10, 12, 13, 15 however, some of them do not show all characteristics of human NAFLD. 8-10, 12, 13, 15 Our model of experimental NAFLD has the advantage of showing all NAFLD and metabolic syndrome features resembling the human disease.

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Strategies, models and biomarkers in experimental non ...

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Experimental diagnostic biomarkers of non-alcoholic fatty liver disease, such as (epi)genetic parameters and ‘-omics’-based read-outs are still in their infancy, but show great promise. In this paper, the array of tools and **models** for the study of **liver** steatosis is discussed.

Cited by: 112 **Author:** Joost Willebrords, Isabel Veloso Alves Pere...

Publish Year: 2015

Strategies, models and biomarkers in experimental non ...

<https://www.sciencedirect.com/science/article/pii/S0163782715000260>

Jul 01, 2015 · **Experimental** non-alcoholic fatty liver disease **models** rely on the application of a diet or the administration of drugs to laboratory animals or the exposure of hepatic cell lines to these drugs. More recently, genetically modified rodents or zebrafish have been introduced as non-alcoholic fatty liver disease **models**.

Cited by: 112 **Author:** Joost Willebrords, Isabel Veloso Alves Pere...

Publish Year: 2015

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Valenzuela R and Videla LA: The importance of the long-chain polyunsaturated fatty acid n-6/n-3 ratio in development of non-alcoholic fatty liver associated with obesity. Food Funct. 2:644–648. 2011. View Article: Google Scholar: PubMed/NCBI. 16 Kim D, Touros A and Kim WR: Nonalcoholic fatty liver disease and metabolic syndrome.

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Alcohol-associated liver disease (ALD) is a common chronic liver disease worldwide with high morbidity and mortality, and no Food and Drug Administration–approved therapies. Fructose (dietary or endogenous), its metabolite uric acid, and aldose reductase (AR, the only endogenous enzyme that produces fructose) are strongly associated with ...

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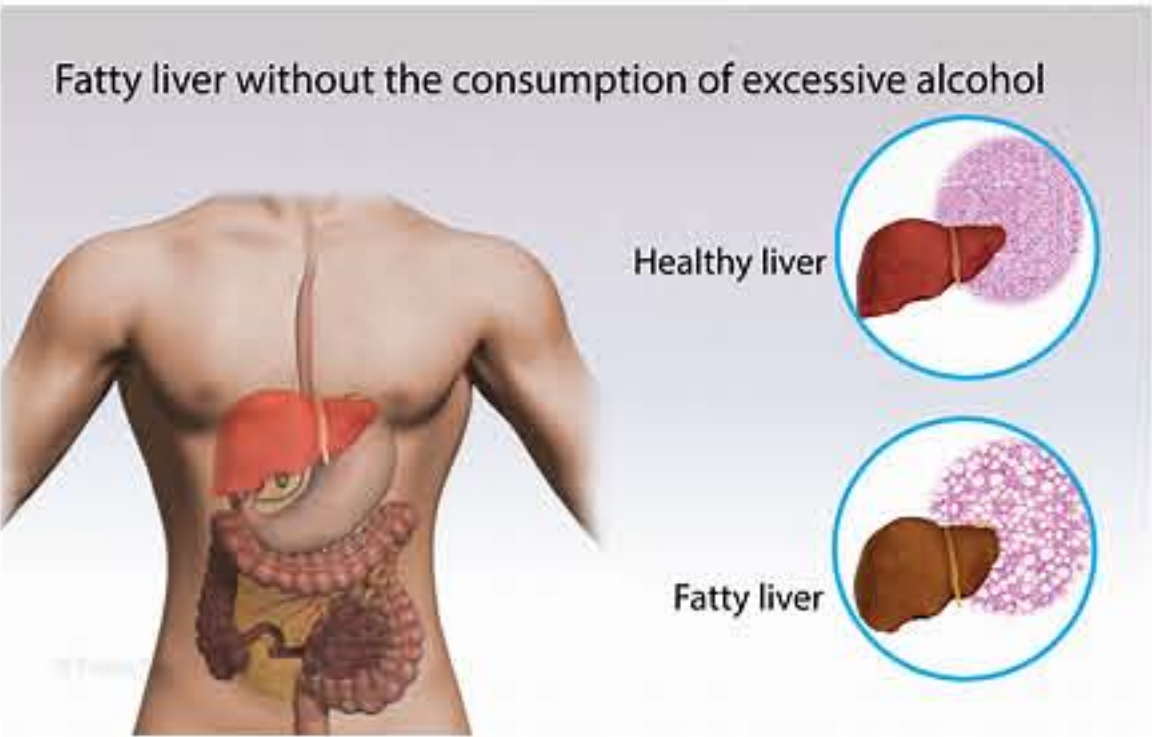
<https://www.mdpi.com/1010-660X/55/2/26>

Non-alcoholic fatty liver disease (NAFLD) is a term that covers a range of hepatic disorders involving fat deposits in the **liver**. NAFLD begins with simple steatosis and progresses into non-alcoholic steatohepatitis (NASH) characterised by inflammation, fibrosis, apoptosis, oxidative stress, lipid peroxidation, mitochondrial dysfunction and release of adipokines and pro-inflammatory cytokines.

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Non-Alcoholic Fatty Liver Disease

Medical Condition



- A condition in which fat accumulates in the liver in people who drink little or no alcohol.
- Very common (More than 3 million cases per year in US)
 - Requires lab test or imaging
 - Treatments can help manage condition, no known cure
 - Can last several years or be lifelong

The cause of non-alcoholic fatty liver disease is not clearly understood. It is associated with obesity, insulin resistance, hyperglycemia, and high levels of fat in blood. The condition does not usually cause symptoms. In some cases, fatigue, enlarged liver, and pain in the upper right abdomen is seen. Non-alcoholic fatty liver disease has no specific treatment. It involves treating underlying conditions such as obesity.

Symptoms

- Usually asymptomatic. Symptoms may include:
- Fatigue
 - Enlarged liver
 - Pain the upper right abdomen
 - Ascites (swelling in the belly)
 - Jaundice
 - Enlarged spleen
- If it progresses to cirrhosis, the following symptoms are seen:
- Enlarged breasts in men
 - Red palms
 - Internal bleeding
 - Fluid retention

Treatments

- Non-alcoholic fatty liver disease has no specific treatment. Treat the underlying conditions and make lifestyle changes.
- Medication**
- Insulin sensitizers: Controls blood sugar (given to patients of Type 2 diabetes).
Metformin
 - Supplements: Improves liver histology in nondiabetic adults.
Vitamin E
 - Statins: Lipid-lowering drugs to treat abnormal blood lipids.
Atorvastatin
- Self care:** Adopting a healthy lifestyle is the main way to manage NAFLD.
- Weight loss: Losing more than 10% of your weight can remove fat from the liver and improve the condition.
 - Physical exercise: Exercise for at least 30 minutes every day. It improves symptoms even if you don't lose weight.
 - Have a balanced diet including plenty of fruits and vegetables.
 - Controlling diabetes and cholesterol levels.
 - Avoid alcohol.
- Medical procedures:** Liver transplantation

Causes

- The cause of non- alcoholic fatty liver disease is not clearly understood. It is associated with:
- Obesity
 - Insulin resistance
 - Hyperglycemia
 - High levels of fat in blood
- Risk factors include hypothyroidism, hypopituitarism, and polycystic ovary syndrome.

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Cited by: 6

Author: Yulia A. Nevzorova, Yulia A. Nevzorova, Zoe...

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