Implen Journal Club | January Issue

Welcome to our January issue of the #Implen #JournalClub in 2022.
New Year's Resolution Edition

In this month's first issue of Implen's NanoPhotometer® Journal Club: New Year's Resolution edition we are covering the topic of the potential consequences of eating at night. Davis et. al recently reported in the journal of Clinical Nutrition that eating at night has been linked to impaired glucose metabolism and dyslipidaemia that is likely a consequence of an underlying disrupted circadian rhythm in metabolic processes.

In this study the differences in the transcriptomic response to food at night vs. morning were investigated– providing a greater understanding of the mechanisms underlying the changing metabolic phenotypes, characterized by circulating metabolic biomarkers, according to the time of day. It was shown that the time of day a meal is consumed had an effect on which genes were differentially regulated immediately following the meal, with only 6.5% of differentially expressed genes the same both morning and night, with more genes involved in lipid metabolic pathways in the morning and immune pathways at night suggesting that key regulatory genes responsible for nutrient sensing and lipid and glucose metabolism are differentially expressed at night.

These may play a role in improved blood glucose control in peripheral tissues that is observed after eating in the morning but to a lesser extent or not at all at night. Modulation of the macronutrient composition of a meal led to changes in expression of genes involved in the circadian clock and metabolism. The Implen NanoPhotometer® was used to assess RNA concentration and purity.

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In the second issue of the Implen Journal Club, we are highlighting the work of Ruknarong et al. who reported in the journal of Biochemistry, Biophysics and Molecular Biology that Vitamin C supplementation reduces expression of circulating miR-451a in subjects with poorly controlled type 2 diabetes mellitus (T2DM) and high oxidative stress.

This study investigated the effect of vitamin C, an essential element required for normal metabolic function, supplementation on circulating miRNA expression in subjects with T2DM and with poor glycemic control and provides evidence that daily supplementation with 1000 mg/day of vitamin C for six weeks can improve blood glucose, lipid profiles, glycated haemoglobin (HbA1C) and insulin in subjects with T2DM.

In addition, this study identified a candidate miRNA that may be used as a biomarker to identify subjects that respond to vitamin C treatment or oxidative status in plasma. The Implen

NanoPhotometer® N60 was used in this study to measure miRNA concentrations.

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Next, we are continuing Implen's NanoPhotometer® Journal Club: New Year's Resolution edition with the topic of severe liver damage due to excessive consumption of alcohol and potential therapeutic approaches. Excessive consumption of alcohol may induce severe liver damage, in part via oxidative stress and inflammatory responses, which implicates these processes as potential therapeutic approaches.

Prior literature has shown that Telmisartan (TEL) may provide protective effects, presumably mediated by its anti-oxidant and anti-inflammatory activities. Amir Mohamed Abdelhamid et. al. recently published a study in the journal of International Immunopharmacology aimed to determine TEL's hepatoprotective effects and to identify its possible curative mechanisms in alcoholic liver disease. They showed that the mechanism of action of Telmisartan may be to modulate ethanol-induced hepatic injury by suppressing NF-κB and may attenuate ethanol-induced hepatic injury via activation of PPAR-γ/Nrf-2 and Hmox-1.

In addition it was shown that Telmisertan inhibited ethanol-induced TNF- α and IL-6 and IL-1β productions and resulted in a clear reduction in the hepatocyte damage.

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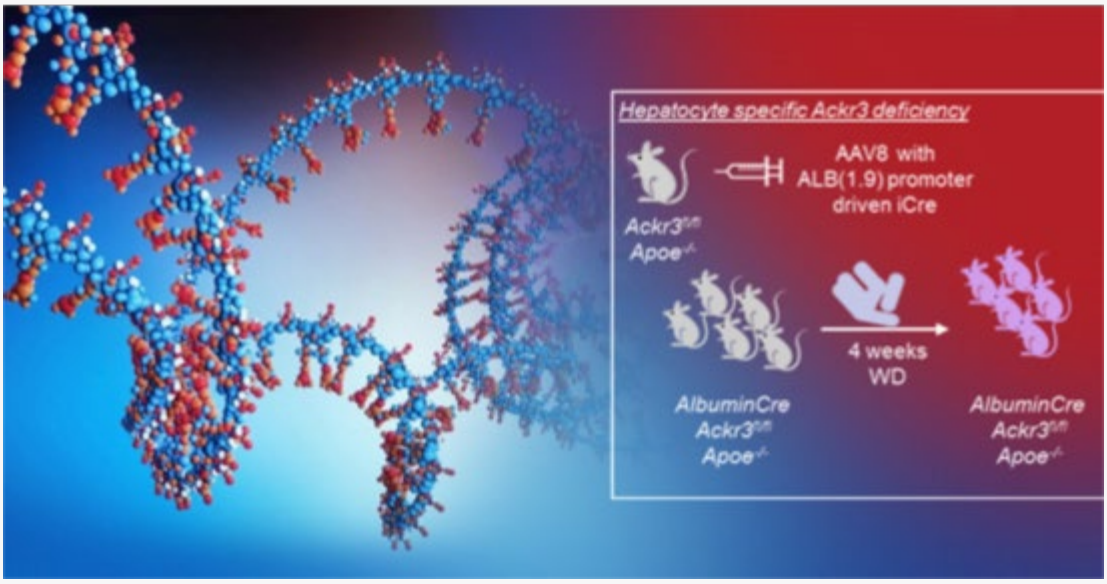

In the final issue, we are exploring the topic of Dysfunctional adipose tissue (AT), which may contribute to the pathology of several metabolic diseases through altered lipid metabolism, insulin resistance, and inflammation. AT is a highly active metabolic organ exerting numerous vital functions in the body including: lipid storage function, glucose homeostasis, hormone secretion, energy homeostasis and thermogenesis.

Gencer et. al. recently published findings in the journal of Biomedicines which highlight a potential therapeutic candidate in the research of metabolic diseases as the atypical chemokine receptor 3 (ACKR3) and that the adipocyte-specific ACKR3 is indeed involved in the regulation of AT lipid levels– suggesting that ACKR3 may be a possible contributor to metabolic diseases, such as insulin resistance, obesity, and atherosclerosis. Given that the chemokine system has been shown to play a fundamental role in health and disease and plays a role in the development of obesity and insulin resistance, the identification of a specific chemokine receptor axes such as ACKR3 regulating pathological processes in the root of these diseases, such as excessive lipid accumulation in tissues, may allow us to manipulate these axes for therapeutic purposes.

The Implen NanoPhotometer® N60/N50 used to determine quality (A260/A280) and the quantity (ng/µL) of the RNA were measured by. A ratio of ~2 for A260/A280 was accepted as good quality RNA.

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