AROMATIC COMPOUNDS AND PHARMACEUTICAL USES THEREOF

Cross Reference to Related Applications

This application claims priority to U.S. Provisional Application No. 62/744,461, filed October 11, 2018, the contents of which are incorporated herein by reference.

Field of the invention

The present invention relates to substituted aromatic compounds, processes for their preparation, pharmaceutical compositions comprising the same, and their use for the treatment of various diseases and conditions in subjects in need thereof.

Background

The rising global epidemic of obesity and its comorbidities, e.g., type 2 diabetes mellitus and hyperlipidemia, is placing an enormous burden both on public health (mortality and morbidity) and on the available public health resources required to treat these conditions.

Current drugs that treat hyperlipidemia (e.g., statins, omega-3 fatty acids, fibrates) have mostly neutral effects on glycemic control, whilst drugs targeting glycemic control e.g., insulin, thiazolidinediones (TZDs), have adverse effects upon bodyweight and (for TZDs) other unwanted side-effects restricting their use.

In addition to hyperlipidemia and type 2 diabetes, a marked increase in the prevalence of non-alcoholic fatty liver disease (NAFLD) has occurred. NAFLD has become the most common chronic liver condition in Western populations in relation to the obesity and type 2 diabetes epidemics. The prevalence of non-alcoholic steatohepatitis (NASH), a form of NAFLD that is associated with hepatic inflammation and ballooning of hepatocytes, is expected to increase by 63% between 2015 and 2030 in the United States (Estes, *Hepatology*, 2018; 67(1): 123-133), where NASH is expected to become the leading cause of liver transplantation by 2020. As liver fibrosis, but not inflammation, is associated with mortality and morbidity in NASH patients, drugs which prevent progression/induce regression of fibrosis are also a focus of biomedical research.

The development of novel compounds that simultaneously target both hyperlipidemia and glycemic control, without the adverse side-effects (e.g., weight gain) typically associated with insulin sensitising drugs is thus a desirable goal. Such compounds would be even more attractive if they could additionally prevent the progression/reverse hepatic fibrosis and reduce hepatic steatosis. The present invention addresses these needs for new treatment methods, compounds, and pharmaceutical compositions.

Summary of the Invention

The present invention relates to compounds of formula (I) or pharmaceutically acceptable salts, solvates, solvates of such salts, or prodrugs thereof, pharmaceutical compositions of those compounds, processes for their preparation, and the use of those compounds or pharmaceutical compositions in the treatment of various diseases and conditions.