diagnosis in high-risk populations, even those that are routinely marginalized, could be more effective.

The authors declare that there is no conflict of interest.

Population	RT performed (%)	RT reactive (%)	PCR positive (%)
Total	297,397	13,085 (4.4)	9,426 (3.2)
General population*	245,156 (82.4)	9,023 (3.7)	6,225 (2.5)
Population in risk			
HIV	33,292 (11.2)	1,478 (4.4)	1,028 (3.1)
PWID	15,652 (5.3)	1,268 (8.1)	1,001 (6.4)
PRISON (CERESO)	2,392 (0.3)	1,098 (24.1)	1,005 (18.5)

RT: Rapid test. *General population with at least one risk factor. HIV: Subjects screened in HIV clinics. PWID: people who inject drugs.
CERESO: State Center for Social Re-adaptation

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CLEAR CELL HEPATOCELLULAR CARCINOMA, A CASE REPORT

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Introduction and Objectives: Clear Cell Hepatocellular Carcinoma (CCHCC) represents 2.2 to 6.7% of all Hepatocellular Carcinomas (HCC), affects mostly women and is frequently associated with liver cirrhosis, viral infections (HBV, HCV), aflatoxins, hemochromatosis, oral contraceptives, obesity and type 2 diabetes mellitus. The most frequent manifestation is a solitary tumor with a pseudocapsule, which is more frequent than in other subtypes of HCC. Histologically, CCHCC can be observed as cells with an empty appearance with abundant cytoplasm, vacuolated and foamy due to the accumulation of glycogen and fat, constituting more than 50% of the total cells. Differential diagnosis with liver metastases can be difficult, so immunohistochemistry is an important diagnostic tool.

Clinical Case: 69-year-old female with a history of hepatitis C virus infection in 2018 receiving direct-acting antiviral treatment for 12 weeks with sustained viral response-12, Child Pugh B liver cirrhosis is documented. 2 years later, the follow-up ultrasound reports liver injury cystic and alpha-fetoprotein at 84.27 ng / ml, so a triphasic tomography was performed, observing liver lesion in segment VII of $35 \times 27 \times 31$ mm suggestive of hepatocellular carcinoma with atypical characteristics, no tumors were reported in another abdominal site, as there was no conclusive radiological criterion for hepatocellular carcinoma, a liver lesion biopsy was performed with a histological report of moderately differentiated clear cell carcinoma and immunohistochemistry with Hepatocyte antigen positive, Carcino-embryonic antigen negative, internal Arginase 1 positive, Glypican 3 positive and Internal renal carcinoma antigen negative, concluding diagnosis of clear cells hepatocellular carcinoma T1B, N0, M0, therefore the patient was referred for transarterial chemoembolization of the lesion.

Discussion: The importance of the current report is to identify histopathological characteristics and establish the usefulness of Immunohistochemistry to make a differential diagnosis with other tumors that can metastasize to and be confused with a primary CCHCC of the liver.

Conclusions: CHCC is a rare subtype of HCC with a more favorable prognosis than other forms of hepatocellular carcinoma, the histological differential diagnosis through immunohistochemistry should be performed with renal cell carcinoma, adrenal cortical carcinoma, clear cell sarcoma, angiolipomas, pulmonary and neuroendocrine clear cell variant, which can metastasize to the liver and be confused. The immunohistochemical study was decisive for the treatment and favorable prognosis of the patient.

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FRUCTOSE DIET INDUCES A METABOLIC REPROGRAMMING TO ENHANCE TUMOR AGGRESSIVENESS

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Introduction and Objectives: HCC is one of the main causes of cancer-related death worldwide and has third place in mortality. One of the main risk factors is metabolic-associated fatty liver disease (MAFLD), having hepatic steatosis, and related metabolic disorders. Mexican population has the highest obesity rate in both children and adults, and the consumption of hypercaloric diets has been related to that. Also, Mexico is in the top five countries with a higher fructose-enriched diet consumption and has been proved already the relation between fructose consumption and MAFLD. Likewise, fructose has been related to metabolic rewiring in transformed cells, enhancing aggressiveness and survival.

Aim: To analyze fructose role on aggressiveness promotion of HCC cells.

Materials and Methods: We used C57Bl/6J mice strain (both sex) with a high Fructose diet (Fru) (33% of fructose in the drinking water, *ad libitum*). Fru supplementation started with 15 days-old mice, two days after DEN was injected (10 μg/Kg, i.p), and the treatment was ended 8 months later. The UAM ethics committee approved the protocol. *In vitro* studies were carried out with the Huh-7 HCC cell line and we evaluated metabolic and biochemical parameters.

Results: Tissue samples were analyzed by H&E. We observed that the fructose-enriched diet group mice presented fat accumulation in the hepatocytes and also areas with a greater inflammatory infiltrate (Fru). Mice in the fructose-enriched diet + DEN (Fru/HCC) group showed a marked difference between the tumor area and the surrounding tissue and an increase in the number of bile ducts, indicating liver tissue damage. Also, we analyzed the protein content of some lipogenic enzymes and noticed an increment in fatty acid synthase (Fasn) in Fru and Fru/HCC. Due to that, we analyzed if Fru treatment was inducing metabolic rewiring in transformed cells. We obtained metabolic changes in fructose-treated cells, reducing the

glycolytic pathway and the traditional Warburg effect. Then we evaluated if the Huh-7 under a Fru treatment was more dependent on mitochondria or glycolysis ATP generation. We observed a reduction in proliferation under oligomycin treatment *vs*. 2-DG treatment. At least, we evaluated the pentose phosphate pathway (PPP) under a Fru treatment and obtained a higher glucose-6-phosphate dehydrogenase (G-6-P DH) activity with Fru *vs*. only glucose (Glc). Also, G-6-P DH had a more efficient activity in the presence of Fru because the time to reach the Vmax is lower *vs*. Glc.

Conclusion: Fructose induces a metabolic rewiring in cancer cells to enhance ATP production, NADPH, and nucleotides to sustain the active lipid synthesis and proliferation. The fructose-enriched diets promote an aberrant lipogenic phenotype enhancing tumor aggressiveness. Conacyt, Froteras de la Ciencia 1320.

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ANTIOXIDANT EFFECT OF SPINACH EXTRACT IN LIVER FIBROGENESIS ASSOCIATED TO ACTIVATION OF NRF2/HO-1 IN HYPERGLYCEMIC RATS

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Introduction and Objectives: In chronic hyperglycemia, increased oxidative stress plays an essential role in liver fibrogenesis. The spinach phytochemicals are shown to possess chemopreventive properties in this condition. Erythroid nuclear transcription factor 2 (Nrf2) is a transcriptional regulator expressing cytoprotective genes such as heme oxygenase-1 (ho-1). HO-1 is an enzyme present in the liver with antioxidant, anti-inflammatory, and anti-apoptotic capacities. However, the beneficial effect of spinach associated with endogenous activation of the Nrf2/HO-1 pathway is unknown. Objective: To evaluate the antioxidant effect of the spinach extract on injury hepatic associated with the Nrf2/HO-1 pathway in hyperglycemic rats.

Materials and methods: The study was approved by the ethics committee from the ENCB-IPN (CONBIOETICA/09/CEI/002/20190327). We used hyperglycemic Wistar rats induced with 60 mg / kg of streptozotocin (HG; n = 7); intragastrical-treated HG with 400mg / kg of spinach methanolic extract (HG-EME; n = 7) and normoglycemic rats (NG; n = 7). Histological sections were obtained at 12 weeks and evaluated by Sirius red staining and immunohistochemistry (Nrf2, HO-1). The oxidative damage by lipid peroxidation was determined by the tissues' malonaldehyde formation (MDA) levels. The H-score system quantified the percentage of nuclear staining of Nrf2 and the intensities of Sirius red and HO-1. Statistical analysis: The data were analyzed by one-way ANOVA with the Tukey test using the GraphPad Prism program (Version 5.0). Kruskal-Wallis and Dunn's test established the MDA training levels. Statistical significance was considered with $p < 0.05$.

Results: Collagen fibers were formed mainly in the centrilobular zone. The percentage of collagen fibers staining in the HG group was 50 ± 10, compared to HG-EME (30 ± 10 $p < 0.05$). In NG, the percentage of fibers was 20 ± 10. The nuclear Nrf2 (nNrf2) and cytoplasmic HO-1 staining were localized in the hepatocytes of region 3 Rappaport. The percentage of nNrf2 in HG was 30 ± 10, compared to HG-EME (70 ± 10 $p < 0.01$). In NG, the staining percentage for nNrf2 was 15 ± 5. For HO-1 staining, the values in the HG-EME group were higher than in the HG group ($p < 0.01$). Contrary, MDA levels in HG-EME decreased significantly compared to HG ($p < 0.05$).

Conclusions: Treatment with EME in hyperglycemic rats showed decreased liver damage generated by oxidative stress, associated with endogenous activation of the Nrf2/HO-1 pathway. The evaluation of liver biochemical tests can demonstrate a beneficial effect of EME. This work was supported by federal resources (HJM0713/19-I) and partially by INCICH.

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NAMPT INHIBITION AND INCREASED NAD-BIOAVAILABILITY ATENUATE LIVER DAMAGE IN CCl_4-INDUCED MICE CHRONIC LIVER DISEASE

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Introduction and Objectives: Nicotinamide phosphoribosyltransferase (NAMPT) is the rate-limiting enzyme on the NAD^+ salvage biosynthetic pathway and a cytokine regulator with an important role in inflammation and fibrogenesis modulation. Use of FK866 (NAMPT inhibitor) has been proposed as a treatment on inflammatory diseases and cancer. However, FK866-induced depletion of NAD may also cause major impairment of the redox and bioenergetics homeostasis of the cell within the liver, thus limiting a favorable outcome for Chronic Liver Disease (CLD), as low NAD levels have been associated with higher Oxidative Stress and increased metabolic risk. The aim of this study was to evaluate the effects of NAMPT inhibition and concomitant NAD restoration on experimental CLD in vivo.

Methods and Results: NAMPT inhibition was evaluated within a CCl_4-induced CLD model on male BALB/c mice and a mild improved outcome was observed on the histological and biochemical features. NAD restoration strategy was accomplished by the concomitant administration of its precursor, NMN, resulting in significant improve on the histological analysis; lower inflammatory infiltrate and fibrosis were measured by image analysis on digitalized micrographies. Lower levels of Direct Bilirubin were also observed. NAMPT inhibition and adequate NAD restoration were confirmed by a colorimetric assay of NADH and NAD^+ and biochemical features were measured by routinary Liver Function Tests. Silymarin was used as a hepatoprotective control.

Conclusion: This study shows that NAMPT inhibition concomitant to NAD restoration significantly attenuate experimental liver damage.

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