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RESEARCH ARTICLE

PREVALENCE OF HUMAN T-CELL LYMPHOTROPIC, HEPATITIS B AND C VIRUSES AMONG HIV PATIENTS IN MANGU LOCAL GOVERNMENT, PLATEAU STATE

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ABSTRACT

Background: Human T- cell Lymphotropic virus, Hepatitis B and C viruses have a common disease they cause "Cancer" apart from other diseases they are known to cause. Although the sites affected differ from one virus to the other. HBV and HCV cause cancer of the liver while HTLV cause cancer of the blood called "Adult T- cell Leukaemia/Lymphoma (ATLL)". All the viruses also have a similar route of transmission with HIV which helps to facilitate their disease manifestations. Therefore, the study was carried out to detect these viral agents among the HIV positive individuals and to determine their coinfections.

Materials and Methods: The research involved 180 subjects who individually completed a questionnaire each and donated blood sample for tests with ELISA and rapid screening methods for HTLV and Hepatitis B and C viruses respectively.

Results: The prevalences of HTLV, HBV and HCV among the HIV positive Subjects were 0.6%, 8.3% and 5.5% respectively. Ages from 16-45 years had the highest infection rate with HBV ($P < 0.05$); while those aged from 46-60 years were highest in HCV infection ($P < 0.05$). However, HTLV had the lowest infection rate (0.6%) among the subjects.

Conclusion: HIV infected individuals have higher risk of infection with viruses that share similar mode of transmission.

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INTRODUCTION

In 1979, T-cell lymphotropic virus was isolated in a patient with cutaneous T-cell lymphoma (Poiesz *et al*, 1980). This led to the discovery of the first HTLV and marked the beginning of the human retrovirus era. Two years later, HTLV-2 was documented in a patient who had been diagnosed with hairy cell leukaemia, although subsequent studies showed no affiliation between the two processes (Kalyanaraman *et al*., 1982). In 1983, the third and most important retrovirus was discovered. At the time of its discovery, this virus was classified in the HTLV genus. However, upon further research, it was reclassified into the Lentivirus genus and given the name human immunodeficiency virus (HIV). In 2005, two novel viruses, HTLV-3 and HTLV-4, were discovered. Little is known about these viruses, as only a few cases have been reported (Szczypinska, *et al.,* 2012).

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HTLV-I has been shown to be associated with at least two well-defined clinical entities, namely Adult T-cell leukemia/lymphoma (ATLL) and HTLV-I associated myelopathy/tropical spastic paraparesis (HAM/TSP) (Nagai and Jacobson, 2001). Recently, HTLV-II has also been shown to be linked with other neurological syndromes (Roucoux and Murphy, 2004). Over 20 million persons are infected with HTLV-I/II globally (Taylor *et al*., 2005). Most are described in highly endemic areas such as Japan, intertropical Africa, the Caribbean's and surrounding regions. Several studies have reported high prevalence of HTLV infections in Africa (Saxinger *et al*., 1999). It is therefore necessary to find out which group of individuals are reservoirs of the virus in the population. In Nigeria, routine diagnosis of HTLV infection is rare. Patients with dual HIV and human T-cell lymphotropic virus (HTLV-1) infections may present with a more serious stage of HIV disease than patients with HIV infection alone (Chavance *et al*., 1995).

Hepatitis is an inflammation of the liver, most commonly caused by a viral infection. There are five main hepatitis viruses, referred to as A, B, C, D and E. Hepatitis A is an acute disease, while hepatitis B and C viruses have a chronic course and are likely to result in complications such as hepatic (liver) cancer and cirrhosis (CDC, 2013). People with HIV infection are often affected by viral hepatitis because of the shared modes of transmission; that about one-third are coinfected with either hepatitis B virus (HBV) or hepatitis C virus (HCV) which can cause long-term illness and death (CDC, 2013). Hepatitis b virus is a species of the genus orthohepadnavirus which is a member of the family hepadnaviridae. It is divided into four major serotypes based on antigenic epitopes present on its envelope proteins and into eight genotypes (A-H) according to overall nucleotide sequence variation of the genome. The virus particle consists of an outer lipidenvelope and an icosahedral nucleocapsidcore composed of protein. The nucleocapsid encloses the viral DNA and a DNA polymerase that has reverse transcriptase activity similar to retroviruses (Locarnini, 2004).

The virus gains entry into the cell by binding to a receptor on the surface of the cell and enters it by endocytosis. The virus membrane then fuses with the host cell's membrane releasing the DNA and core proteins into the cytoplasm and because the virus multiplies via RNA made by a host enzyme, the viral genomic DNA has to be transferred to the cell nucleus by host proteins. The core proteins dissociate from the partially double stranded viral DNA (- sense) is then made fully double stranded (+ sense) and transformed into covalently close circular DNA (Locarnini, 2004). The negative sense is complementary to the viral mRNA. There are four known genes encoded by the genome called C, P, S and X. The core protein is coded for by gene C (HBcAg). HBeAg is produced by proteolytic processing of the pre-core protein. The DNA polymerase is encoded by gene P. Gene S is the gene that codes for the surface antigen (HBsAg). The function of the protein coded for by gene X is not fully understood (Bouchard and Schnider, 2004). The four viral transcripts undergo additional processing and go on to form progeny virions which are release from the cell or returned to the nucleus and recycle to produce even more copies.

The hepatitis C virus belongs to the genus *Hepacivirus* a member of the family *Flaviviridae*. The hepatitis C virus particle consists of a core of genetic material (RNA), surrounded by an icosahedral protective shell of protein, and further encased in a lipid (fatty) envelope of cellular origin. Two viral envelope glycoproteins, E1 and E2, are embedded in the lipid envelope (De Beeck and Dubuisson (2003). Hepatitis C virus has a positive sense single-stranded RNA genome. The genome consists of a single open reading frame that is 9600 nucleotide bases long (Kato, 2000). This single open reading frame is translated to produce a single protein product, which is then further processed to produce smaller active proteins. Replication of HCV involves several steps. The virus replicates mainly in the hepatocytes of the liver, where it is estimated that daily each infected cell produces approximately fifty virions (virus particles) with a calculated total of one trillion virions generated.

The virus may also replicate in peripheral blood mononuclear cells, potentially accounting for the high levels of immunological disorders found in chronically infected HCV patients. Entry into host cells occurs through complex interactions between virions and cell-surface molecules. Once inside the hepatocyte, HCV takes over portions of the intracellular machinery to replicate (Lindenbach and Rice, 2005). The HCV genome is translated to produce a single protein of around 3011 amino acids. The polyprotein is then proteolytically processed by viral and cellular proteases to produce three structural (virion-associated) and seven nonstructural (NS) proteins. Alternatively, a frameshift may occur in the Core region to produce an Alternate Reading Frame Protein (ARFP) (Branch *et al*., 2005). HCV encodes two proteases, the NS2 cysteine autoprotease and the NS3-4A serine protease. The NS proteins then recruit the viral genome into an RNA replication complex, which is associated.

Treatment is primarily focused on managing the conditions associated with HTLV, since no cure has been developed (Smith, 2012). A combination of interferon-alpha and zidovudine had been reported to be effective in treating ATL patients. A combination of zidovudine, danazol, and Vitamin C is used in providing temporary relief for TSP patients. There is no established treatment program for HAM/TSP, although some patients may be given steriods. Clinical studies using interferon-alpha and plasmapherisis have not shown significant patient improvement. Spasticity may be treated with baclofen or tizanidine. Urinary dysfunction should be treated with self-catheterization or oxybutynin (Machigashira *et al*., 2012). Therapies studied include corticosteroids plasmapherisis, cyclophosphamide and interferon, which may produce a temporary symptomatic improvement in myelopathy symptoms. Valproic acid has been studied to determine if it might slow the progression of HLTV disease by reducing viral load.

There is no specific treatment for acute hepatitis B. Care is aimed at maintaining comfort and adequate nutritional balance, including replacement of fluids that are lost from vomiting and diarrhoea. People with chronic hepatitis B who require treatment can be given drugs, including oral antiviral agents, such as lamivudine and tenofovir. Interferon injections can also be used. Surgery and chemotherapy can be used for cancer cases while people with cirrhosis are sometimes given liver transplants (WHO, 2012). Competition between hepatitis B virus (HBV) and hepatitis C virus (HCV) in HIV positive people with triple infection appears to promote spontaneous HCV clearance, but lower CD4 T-cell counts and greater liver inflammation reduce the likelihood of clearance (Highleyman, 2010).

And that HIV/HCV coinfected people treated with telaprevir (Incivek) triple therapy are significantly more likely to achieve sustained virological response, or a cure, than people treated with pegylated interferon/ribavirin alone, according to final results from Study 110 presented at the American Association for the Study of Liver Diseases. Highleyman, 2010 study also showed that near-perfect adherence to pegylated interferon plus ribavirin offers the best chance of sustained virological response or a cure for HIV positive people coinfected with

hepatitis C virus (HCV) and that treatment with tenofovir (Viread) led to hepatitis B surface antigen (HBsAg) clearance considered the closest outcome to a cure in 8% of HIV positive patients with chronic hepatitis B virus (HBV) coinfection, and in a subgroup clearance was associated with CD4 T-cell count. The HIV integrase inhibitor raltegravir (Isentress) was well-tolerated and demonstrated continued effectiveness for 5 years in treatment-naive and 3 years in treatment-experienced HIV patients coinfected with hepatitis B or C (Highleyman, 2010).
Treatment of acute viral hepatitis and chronic viral hepatitis are different. Treatment of acute viral hepatitis involves relieving symptoms and maintaining adequate intake of fluids. Treatment of chronic viral hepatitis involves medications to eradicate the virus and taking measures to prevent further liver damage.

In patients with acute viral hepatitis, the initial treatment consists of relieving the symptoms of nausea, vomiting, and abdominal pain. Careful attention should be given to medications which can have adverse effects in patients with abnormal liver function. Only those medications that are considered necessary should be administered since the impaired liver is not able to eliminate drugs normally, and drugs may accumulate in the blood and reach toxic levels. In addition, sedatives and "tranquilizers" are avoided because they may accentuate the effects of liver failure on the brain and cause lethargy and coma. The patient must abstain from drinking alcohol since alcohol is toxic to the liver. It occasionally is necessary to provide intravenous fluids to prevent dehydration caused by vomiting. Patients with severe nausea and/or vomiting may need to be hospitalized for treatment and intravenous fluids (Dennis and Jay, 2013).

Treatment of chronic infection with hepatitis B and hepatitis C usually involves medication or combinations of medications to eradicate the virus. Doctors believe that in properly selected patients, successful eradication of the viruses can stop progressive damage to the liver and prevent the development of cirrhosis, liver failure, and liver cancer. Alcohol aggravates liver damage in chronic hepatitis, and can cause more rapid progression to cirrhosis. Therefore, patients with chronic hepatitis should stop drinking alcohol. Smoking cigarettes also can aggravate liver disease and should be stopped (Dennis and Jay, 2013). The studies further indicated that the medications for chronic hepatitis C infection include: injectable interferon and oral ribavirin, while the medications for chronic hepatitis B infection include: injectable interferon, oral lamivudine (Epivir),oral adefovir (Hepsera) and oral entecavir (Baraclude) .Screening of blood donations for HTLV should be carried out in high prevalence areas such as Japan and in low prevalence areas as well. Research is being carried out on the development of a vaccine against HTLV-I.

The hepatitis B vaccine is the mainstay of hepatitis B prevention. WHO recommends that all children and adolescents younger than 18 years old and not previously vaccinated should receive the vaccine. People in high risk groups should also be vaccinated, including: people with high-risk sexual behaviour , partners and household contacts of infected people, injecting drug users, people who frequently require blood or blood products, recipients of solid organ transplantation, people at occupational risk of hepatitis B virus infection, including health-care workers and travellers to countries with high rates of hepatitis B (WHO, 2012). The vaccine can be given as either three or four separate doses, as part of existing routine immunization schedules. In areas where mother-to-infant spread of the hepatitis B virus is common, the first dose of vaccine should be given as soon as possible after birth (i.e. within 24 hours). The complete vaccine series induces protective antibody levels in more than 95% of the individuals. Protection lasts at least 20 years and is possibly lifelong (WHO, 2012). For general preventive measures, individuals should avoid unprotected insertive sex, and sharing of any personal items that may have another person's blood on them, such as sex toys, needles (including tattoo needles), toothbrushes, and razors. Use of condoms for sex is highly recommended. No HCV vaccine is available, but research is ongoing (Mims *et al*., 2004)

MATERIALS AND METHODS

One hundred and eighty (180) volunteered HIV positive patients of age from eighteen (18) months and 70 years drawn from the General hospital Mangu (n=90) and COCIN hospital Panyam (n= 90), Plateau state, Nigeria, were used for the study. Both sexes (men – 135, women – 45) were involved in the research work. Questionnaires were administered to consenting subjects while 4mls of blood were also collected in an EDTA vacutainer tubes from each of them. The serum was separated and tested for the presence of HTLV antibody using: an Anti- HTLV1/2 ELISA kit (By Diagnostic Automation Incorporation, Calabasaa. Cat # No. 8196-12). The assay was carried out using the kit manufacturer's instructions with the controls being tested concurrently with the test samples.

HBsAg test strip (Skytec, USA. Lot number: SK6008Y) was used for hepatitis B screening. The one step hepatitis B surface antigen (HBsAg) test strip was a rapid and direct binding test for the visual detection of HBsAg as an aid in the diagnosis of hepatitis B infection. The test was done according to manufacturer's instruction. HCV test strip (Skytec, USA. Lot number: SK6005Y) was used. The HCV is a qualitative, membrane based immunoassay for the detection of antibody to HCV in plasma/serum. The test was also done according to the manufacturer's instruction.

RESULTS

A total of 180 patients (90 from each hospital) aged between 18 months and 70 years were used in the study. Out of these, 135 (75.5%) were females and 45 (25.0%) were males (Table 1). Thirteen (7.2%) among the patients who used condom during sexual intercourse were seropositive for HBV, while 5(2.7%) were positive for HCV (tables 5 and 8). In all the patients screened, 1 (0.6%) was seropositive for HTLV, 15 (8.3%) for HBV and 10(5.6%) for HCV (Table 1). The only one patient seropositive for HTLV was a 40 year old female patient attending COCIN hospital Panyam. Seroprevalence of the viral agents showed that COCIN hospital Panyam was highest for HBV (8.9%), HCV (8.9%) and HTLV (1.1%) (Table 2). Patients from age 16 to 30years and those that practiced kissing during sexual activity had high tendency to be infected with HBV (Table 4 and 5) ($P < 0.05$).

Table 1. Sero-prevalence of HTLV, HBV and HCV Based on Sex Among HIV Patients in Mangu Local Government, Plateau State

Sex	No Tested	HTLV Pos(%)	HBV Pos(%)	HCV Pos(%)
Male	45	0(0.0)	7(3.9)	4(2.2)
Female	135	1(0.6)	8(4.4)	6(3.3)
Total	180	1(0.6)	15(8.3)	10(5.5)

Table 2. Distribution of HTLV, HBV and HCV Among HIV Patients in the Two Hospitals studied

C H Panyam Viruses	No Tested	No Positive	%Positive	X^2	P- Value
HTLV	90	1	1.1	0.00	0.992
HBV	90	8	8.8	0.00	0.997
HCV	90	8	8.8	0.00	0.997
G H ManguHTLV	90	0	0.0	0.00	0.860
HBV	90	7	7.8	0.00	0.996
HCV	90	2	2.2	0.00	0.997

Table 3. Seroprevalence of HTLV According to Age Group in Mangu Local Government, Plateau State

Age Group	No Tested	No Positive	% Positive	X^2	P- value
1-5	5	0	0.0	0.00	0.793
6-10	1	0	0.0	0.00	0.793
11-15	0	0	0.0	0.00	0.793
16-20	3	0	0.0	0.00	0.793
21-25	19	0	0.0	0.00	0.793
26-30	38	0	0.0	0.00	0.793
31-35	38	0	0.0	0.00	0.793
36-40	31	1	0.0	0.00	0.793
41-45	16	0	0.0	0.00	0.793
46-50	15	0	0.0	0.00	0.793
51-55	6	0	0.0	0.00	0.793
56-60	5	0	0.0	0.00	0.793
61-65	0	0	0.0	0.00	0.793
65-70	3	0	0.0	0.00	0.793

Table 4. Seroprevalence of HBV by Risk Factors Among HIV Patients in Mangu Local Government, Plateau State

Risk Factors	No Tested	HBsAg Positive	% Positive	X^2	P-value
Use of Condom					
Yes	115	13	7.2	2.89	0.088
No	65	2	1.1	2.37	0.123
No. of Sex Partner					
0	39	0	0.0	0.00	0.242
1	125	14	7.8	2.00	0.156
≥ 2	16	1	0.6	9.25	0.243
Heterosexual					
Yes	180	15	8.3	0.00	0.987
No	0	0	0.0	0.00	0.242
Kissing					
Yes	82	7	3.8	4.73	0.029
No	98	8	4.4	3.18	0.074
Intravenous Drug Use					
Yes	0	0	0.0	0.00	0.242
No	180	15	8.3	0.00	0.997

However, those from age 46 to 60 had higher tendency to be infected with HCV (Table 7) ($P < 0.05$). Also, age 31 to 40 were more likely to be infected with both HBV and HCV (Tables 5 and 7) ($P < 0.05$). Patients who did not use condom during sexual intercourse were more likely to be infected with HCV (Table 6 and 7) ($P < 0.05$).

DISCUSSION

The research investigated the prevalence of HTLV-1/2, HBV and HCV among HIV patients in Mangu Local Government Area of Plateau State. Similar studies have been done in countries such as Brazil and Mozambique.

Table 5. Seroprevalence of HBV Based on Age Group Among HIV Patients in Mangu Local Government, Plateau State

Age Group(Yrs)	No.Tested	HBsAg Positive	% Positive	X^2	P-value
1-5	5	0	0.0	0.00	0.793
6-10	1	0	0.0	0.00	0.793
11-15	0	0	0.0	0.00	0.793
16-20	3	1	0.6	28.65	0.000
21-25	19	1	0.6	6.92	0.000
26-30	38	4	2.2	12.24	0.000
31-35	38	4	2.2	12.24	0.000
36-40	31	3	1.7	11.80	0.000
41-45	16	2	1.0	21.37	0.000
46-50	15	0	0.0	0.00	0.793
51-55	6	0	0.0	0.00	0.793
56-60	5	0	0.0	0.00	0.793
61-65	0	0	0.0	0.00	0.793
66-70	3	0	0.0	0.00	0.793
Total	180	15	8.3	0.00	0.987

Table 6. Sero-prevalence of HCV by Risk Factors Among HIV Patients in Mangu Local Government, Plateau State

Risk Factors	No Tested	HCV Positive	% Positive	X^2	P-value
Use of Condom					
Yes	117	5	2.7	1.36	0.242
No	63	5	2.7	4.64	0.031
No. of Sex Partner					
0	37	3	1.7	4.11	0.042
1	115	7	3.9	0.83	0.360
≥ 2	15	0	0.0	0.00	0.422
Heterosexual					
Yes	180	10	5.6	0.00	0.979
No	0	0	0.0	0.00	0.242
Kissing					
Yes	82	3	1.7	1.97	0.160
No	98	7	3.9	0.00	0.955
Intravenous Drug Use					
Yes	0	0	0.0	0.00	0.242
No	180	10	5.6	0.00	0.979

Table 7. Sero-prevalence of HCV Based on Age Group Among HIV Patients in Mangu Local Government, Plateau State

Age Group(Yrs)	No.Tested	HCV Positive	% Positive	X^2	P-value
1-5	5	0	0.0	0.00	0.793
6-10	1	0	0.0	0.00	0.793
11-15	0	0	0.0	0.00	0.793
16-20	3	0	0.0	0.00	0.793
21-25	19	0	0.0	0.00	0.793
26-30	38	1	0.6	2.60	0.104
21-25	38	2	1.1	6.05	0.004
36-40	31	2	1.1	8.16	0.793
41-45	16	0	0.0	0.00	0.000
46-50	15	2	1.1	20.63	0.00
51-55	6	1	0.6	25.97	0.00
56-60	5	2	1.1	76.81	0.00
61-65	0	0	0.0	0.00	0.793
66-70	3	0	0.0	0.00	0.793
Total	180	10	5.5	0.0	0.997

However, the prevalence data about HIV patients on these viral agents are not common in Nigeria. The low prevalence rate of HTLV-1/2 observed in this study agrees with the work done by Afiono *et al*., 2013 who had a prevalence rate of 1.3% in a study among drug abuser inmates in Central Javan, Indonesia. In this study, no patient has had a history of a receipt of influenza vaccine within the period under study and therefore there was no case of false positive HTLV due to influenza vaccination.

This concurs with the report by the centre for disease control (CDC, 1993), that serologic tests for HTLV-1 among blood donors following influenza vaccination gave false positive HTLV results. Condom use was likely the reason for the low rate of acquisition or transmission of HTLV-1/2 among the subjects. This would have been made possible because HIV positive patients are always provided with condoms and counselling in the clinics on the need to avoid acquisition and spread of resistant HIV strains and other infections that could

worsen their conditions. The result could also be attributed to the low prevalence rate of people infected with HTLV in Plateau State and the country at large. In this study, it was shown that the only positive patient was a female of forty (40) years. This research is consistent with the work done by CDC, 2003 who reported that the seroprevalence of HTLV tend to increase with age and that in elderly groups, the rates are generally higher among women. Though, scientific documentation to back up this assertion has not been made available. The result however, is not statistically significant. To compare the HTLV seroprevalence between the two hospitals, General hospital Mangu had 0.0% while COCIN hospital Panyam recorded 0.6%. The difference however is not significant; it could just be due to research coincidences.

Due to overlapping risk factors, many HIV positive patients are coinfected with HBV and/ or HCV. The prevalence of coinfection of HIV and HBV in this study shows a rate of 8.3% which is higher than 3.7% reported by Laufer *et al*., 2010 among people living with HIV/AIDS in Argentina and 6.5% discovered by Christian *et al*., 2010 on HIV infected patients in Tanzania. However, the value observed in this study is inconsistent with the 14.5% prevalence established by Mohsen *et al*., 2009 when taking a survey of both HBV (HBsAg) and HCV (HCV- Ab) coinfection among HIV positive patients in Iran. Since there is no such prevalence data established in Mangu Local Government, the data from this study shows that the prevalence rate of HIV/HBV coinfection is high.

The HCV prevalence of 5.5% observed in this study is higher than the 1.4% prevalence data presented by Christian *et al*., 2010. However, work done by Mohsen *et al*., 2010 shows a higher prevalence of HIV/HCV coinfection of 21.0%. In this study therefore, the prevalence rates of coinfection of HIV/HBV and HIV/HCV are high even though they are not significant. There is a significant correlation between coinfection of HIV/HBV and HIV/HCV with sex, as the rate is higher among men than women in this study. The high in the prevalence of HBV and HCV among the HIV patients could be due to their common mode of transmission. The study shows a prevalence of 0.6% of HIV/HBV/HCV coinfection. This agrees with the research done by Christian and co-researchers in Tanzania who reported 0.04% prevalence rate (Christian *et al.,* 2010).

This therefore indicates that the coinfection of HIV, HBV and HCV is not common in Africa. To compare the coinfection of the hepatitis viruses in the two hospitals, COCIN hospital Panyam has coinfection rates of 8.9% for HIV/HBV and 8.9% for HIV/HCV, while General hospital Mangu has 7.8% for HIV/HBV and 2.2% for HIV/HCV. Even though there is no significant difference in the prevalences between the two hospitals, COCIN hospital panyam still has a higher prevalence rates of HIV/HBV and HIV/HBV coinfections. The research also indicates that there is 0% prevalence of HIV/HBV/HCV and HTLV coinfection among the patients recruited. Although we have not come across such research indicating the prevalence that involved the coinfection of these viruses in Nigeria, we could conclude that the coinfection of these viruses may not be common among the Nigerian community.

Conclusion

The patients that were coinfected with HBV, HCV or HTLV would have the tendency to develop worst condition if not attended to, and could result to either hepatocellular carcinoma or adult T-cell leukemia and HTLV-1 associated myelopathy/Tropical spastic paraparesis.

REFRENCES

Afino, A., Prasetyo, Paramasari, D., Yulia Sari, Hudiyono, H. and Seiji, K. 2013. Molecular epidemiology of HIV, HBV, HCV and HTLV-1/2 in drug abuser inmates in central Javan prisons, Indonesia. Printed ISSN: 2036-6590

Bouchard, M.J. and Schneider R.J. 2004. The enigmatic X gene of Hepatitis B virus. *Journal of virology*.78(23) 12725-34.

Branch, A. D., Stump, D. D., Gutierrez, J. A., Eng, F. and Walewski, J. L. 2005. "The Hepatitis C Virus Alternate Reading Frame (ARF) and Its Family of Novel Products: The Alternate Reading Frame Protein/F-Protein, the Double-Frameshift Protein, and Others". *Seminars in Liver Disease* 25 (1): 105–117.

Centers for Disease Control and Prevention 1993 False-positive serologic tests for HTLV-1 among blood donors following influenza vaccination. 42 (09); 173-175. Last Reviewed 5th February, 2001

Centers for Disease Control and prevention 2013. Viral Hepatitis. Division of Viral Hepatitis and National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention. Last modified 17th May. http://www.cdc.gov/hepatitis/B/bFAQ.htm

Centers for Disease Control and Prevention, 2003. Dual Infections With HIV-1, HIV-2 and HTLV-I Are More Common in Older Women Than in Men in Guinea-Bissau. *01.24.03; Volume 17: 241-253.*

Chavance, M., Neisson-Vernant, C., Quist, D., Monplaisir, N., Armengaud, B. and Chout, R. 1995. Journal of Acquired Immune Deficiency Syndromes and Human Retrovirology. Lippincott Williams & Wilkins, WK Health.

Christian, B., Okuma, J. and Hawkins, C. 2010. prevalence of Hepatitis B and C coinfection and response to Antiretroviral therapy among HIV-infected patients in an urban setting, Tanzania. 17th conference on Retroviruses and opportunistic infections (CROI).San Francisco. Abstract 694.

De Beeck, A. and Dubuisson, J. 2003. "Topology of hepatitis C virus envelope glycoproteins". *Review of Medical Virology,* 13 (4): 233–41.

Dennis, L. and Jay, W.M. 2013. Viral hepatitis.pg 1-3

Highleyman, L. 2010. HIV and Hepatitis.com coverage of the 17th conference on Retroviruses and opportunistic infection. February 16-19, San Francisco, California.

Kalyanaraman, V.S., Sarngadharan, M.G., Robert-Guroff, M., Miyoshi, I., Golde, D. and Gallo, R.C. 1982. A new subtype of human T-cell leukemia virus (HTLV-II) associated with a T-cell variant of hairy cell leukemia. *Science*, 218(4572):571-3.

Kato, N. 2000. "Genome of human hepatitis C virus (HCV): gene organization, sequence diversity, and variation". *Microbiology and Genomics,* 5 (3): 129–51.

Laufer, N., Quarteri, J., Bouzas, M.B., Juncos, G., Cabrini, M., Moretti, F., Bolcic, F., Fernande, Z., Giuliano, S., Mammana, L., Salomon, H. and Cahn, P. 2010. Hepatitis B virus, Hepatitis C virus, and HIV coinfection among people living with HIV/AIDS in Buenos Aires, Argentina.

Lindenbach, B. and Rice, C. 2005. "Unravelling hepatitis C virus replication from genome to function". *Nature,* 436 (7053): 933–8.

Locarnini, S. 2004. Molecular virology of hepatitis B virus. Seminar on Liver diseases 24(1): 3-10

Machigashira, N., Yoshida, Y., Wang, S. and Osame, M. 2012. "HTLV-1-associated myelopathy/tropical spastic paraparesis with pseudohypoparathyroidism". *Neurology* 56 (1): 104–6.

Mims, C., Dockrell, H., Goering, R.V, Roitt, I., Wakelin, D. and Zuckerman, M. 2004. Medical Microbiology; 3rd edition, Edinburg. Mosby Publishers Limited. Pg 66o.

Mohsen, M., Gholamreza, T., Ali, S., Farzad, E., Yadollah, P., Ehsan, G., and Hadis, B. 2009. Survey of both hepatitis B and C viruses coinfection among HIV positive patients. *Virology Journal* 6:202

Poiesz, B., F. Ruscetti, A. Gazdar, P. Bunn, J. Minna, and R. Gallo 1980. Detection and isolation of type C retrovirus particles from fresh and cultured lymphocytes of a patient with cutaneous T-cell lymphoma. *National Academic of Science*. USA 77:7415–7419.

Roucoux, D.F. and Murphy, E.L. 2004. The epidemiology and disease outcomes of human T lymphotropic virus type II. AIDS Review. 6(3):144–154.

Saxinger, W., Blattner, W.A., Levine, P.H., Clark, R., Biggar, R., Hoh, M., Moghissi, J., Jacobs, P., Wilson, L. and Jacobson, S. 1999. HTLV-I antibodies in Africa. Science. 225:1473–1476.

Smith, S.E. 2012. What is Human T- cell Lymphotropic virus? Pg 1-2.

Szczypinska, E. M., Mark, R.W., Booth, W., Christopher, M.S., Josiah, D.R., Francisco, T., Joseph, F.J. and Eleftherios, M. 2012. Human T-Cell Lymphotrophic Viruses

Taylor, G..P, Bodeus, M., Courtois, F., Pauli, G., Del Mistro, A., Machuca, A., Padua, E., Andersson, S., Goubau, P., Chieco-Bianchi, L., Soriano, V., Coste, J., Ades, A.E. and Weber, J.N. 2005. *Journal of Acquired Immune Deficiency Syndrome.* 38: 104−109.

World Health Organization 2012. Hpatitis B. Fact sheet N°204. Updated 2013. Available at: htt://www.who.int/csr/ disease/hepatitis.

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