World Journal of AIDS, 2016, 6, 74-80
Published Online June 2016 in SciRes. http://www.scirp.org/journal/wja
http://dx.doi.org/10.4236/wja.2016.62011

Scientific Research Publishing

Assessment of Antiretroviral Efficacy of the *Medicinal Synthetic Aluminum-Magnesium Silicate* $\{Al_4(SiO_4)_3 + 3Mg_2SiO_4 \rightarrow 2Al_2Mg_3(SiO_4)_3\}$

Maduike C. O. Ezeibe[1], Dahiru Aleeyu[2], Nnaemeka K. Aneke[3], Thompson N. Obarezi[3], Ijeoma J. Ogbonna[1], Ekenma Kalu[1]

[1]College of Veterinary Medicine, Michael Okpara University of Agriculture, Umudike, Nigeria
[2]Basic Health Clinic, Abuja, Nigeria
[3]Medical Centre, Michael Okpara University of Agriculture, Umudike, Nigeria
Email: maduikeezeibe@yahoo.com

Received 10 May 2016; accepted 26 June 2016; published 29 June 2016

Abstract

HIV/AIDS patients were treated, daily, with MSAMS (50 mg/kg), MSAMS-stabilized Ampicillin trihydrate (7.5 mg/kg) and immunace extra-protection® (1 tablet), for one month and then, with only MSAMS and the immune stimulants. They were tested, monthly, for viral loads and CD4-lymphocytes counts. Those whose viral loads became undetectable were tested for HIV confirmation (antigens/antibody). Their mean-viral load increased (*P* = 0.020) from 1820.30 ± 868.75 to 2855.90 ± 960.98 after first month, before reducing (*P* = 0.0.030) to: 1565.20 ± 743.17; 759.20 ± 473.65; 345.50 ± 115.01; 192.80 ± 97.40; 95.00 ± 55.80; 37.40 ± 26.46; 17.50 ± 16.88 (undetectable). Their mean-CD4 count was 496.80 ± 194.39 (lymphopenia). It reduced (*P* = 0.008) to 263.90 ± 149.26 after first month, before increasing (*P* = 0.001) to: 507.90 ± 133.19; 692.70 ± 113.34; 840.20 ± 139.41; 1007.30 ± 163.50; 1537.10 ± 302.10; 1924.60 ± 247.45; 2707.00 ± 837.87 (lymphocytosis). Patients whose viral loads became undetectable tested HIV-negative, one month after. CD4-lymphocytes count, approximating to zero-viral load, calculated from equation (Y = 2297.80 – 1.4731X) of *line of best fit* of graph of their viral loads onCD4-lymphocytes counts, was 1559.84/ml.

Keywords

HIV, MSAMS-*Nanoparticles*, Opposite Electrical Charges, HIV-Positive, Lymphopenia, HIV-Antigens/Antibody Negative, Lymphocytosis

How to cite this paper: Ezeibe, M.C.O., Aleeyu, D., Aneke, N.K., Obarezi, T.N., Ogbonna, I.J. and Kalu, E. (2016) Assessment of Antiretroviral Efficacy of the *Medicinal Synthetic Aluminum-Magnesium Silicate* $\{Al_4(SiO_4)_3 + 3Mg_2SiO_4 \rightarrow 2Al_2Mg_3(SiO_4)_3\}$. *World Journal of AIDS*, **6**, 74-80. http://dx.doi.org/10.4236/wja.2016.62011

1. Introduction

Nanoparticles which form molecules of Aluminum-magnesium silicate (AMS) are only 0.96 nm thick and have positive electrical charges on their edges and negative charges on their surfaces [1] while the *Human immune deficiency virus* (HIV) has net positive electrical charges [2] and is, at least, 110 nm in diameter [3]. That means, AMS-*Nanoparticles* are over hundred times smaller than the smallest (immature) HIV. Their smaller size allows AMS-*Nanoparticles* access to any organ/tissue HIV invades, to mop it out, by bonding their surfaces to its positive charges. Thus, first stage in the viral replication is inhibited [4]. They also adsorb onto negative charges on infected cells [5] with their edges and destroy them by the mechanism AMS traditionally disintegrates drug-capsules [1]. Thus "hidden HIV infections" are unmasked. When 100% of population of HIV invading organs/tissues of a patient is mopped out, the infection terminates.

Attributes of HIV infections include symptoms, presence of the antibody in blood, immune deficiency which manifests as lymphopenia (CD4-lymphocytes counts <500/ml) and copies of HIV RNA-antigen in their plasma (viral load). Because of the immune deficiency, most symptoms associated with HIV/AIDS are those of secondary infections, prevalent in the environment. They include anxiety, dementia, depression, insomnia, emaciation, dermatitis, fever, pneumonia, joint pain and boils [6]. In Nigeria, HIV-infected people often come down with concurrent tuberculosis or viral hepatitis. Therefore, use of symptoms to assess efficacy of antiretroviral therapies (ARTs) is unreliable. Assessing treatments by presence of HIV antibody, alone, is also unreliable because, that could give both false negative and false positive results [7].

In HIV infected individuals, as viral loads increase, CD4-lymphocytes counts decrease. Even during the HIV-replication phase called *virus-set-point*, when the viral loads remain fairly stable, depletion of CD4-lymphocytes still continues [8]. So, comparing viral loads withCD4-lymphocytes counts of HIV/AIDS patients and testing for persistence or regression of the antigens and antibody from their blood would be reliable methods of assessing efficacy of ARTs.

There are large deposits of Aluminum silicate $\{Al_4(SiO_4)_3\}$ and Magnesium silicate $\{Mg_2SiO_4\}$ in Nigeria. The two minerals are already in use as medicines for treatment of various animal and human diseases [9]. Therefore for a purer form of AMS $\{Al_2Mg_3(SiO_4)_3\}$, Aluminum silicate and Magnesium silicate were reacted [10]: $\{Al_4(SiO_4)_3 + 3Mg_2SiO_4 \rightarrow 2Al_2Mg_3(SiO4)_3\}$. Dextrose monohydrate was formulated with the *medicinal synthetic Aluminum-magnesium silicate* (MSAMS, **Antivirt®**), to carry its molecules, by active transport [11], across mucous membranes of the gastro-intestinal tract, into blood which carries them to all organs/tissues.

That the Antivirt® inhibits HIV, *in vitro*, has been reported [12]. It has also been reported to cure *Paramyxoviridae*, *Parvoviridae* and *Birnarviridae* viral infections [13]-[15]. So, this study was designed to test effects of synergy that may occur when HIV/AIDS patients are treated with Antivirt® and their immune responses are, at same time, enhanced with immune stimulants, on: their viral loads, their CD4-lymphocytes counts and on regression of the viral antigens and antibody from their blood.

2. Materials and Methods

A formulation, of the ***Medicinal synthetic Aluminum-magnesium silicate*** (MSAMS), patented by Nigerian government [10], as antiviral medicine and Ampicillin trihydrate (Antivirt A®) and a formulation of the MSAMS alone (ANTIVIRT B®) were used for the clinical trial. To enhance immune responses of patients, Vitabiotics' immunace extra protection® was used. Journal publications which reported that AMS is a safe medicine and those that reported antiviral effects of the MSAMS were used to counsel HIV/AIDS patients. Patients who became convinced that the Antivirt ® is safe and can lead to cure of HIV/AIDS, applied for the clinical trial, through their physicians.

Ten HIV-positive adults (3 men and 7 women) who volunteered to participate in the clinical trial were placed on oral medication, with ANTIVIRT A® for one month, at dose rates of 50 mg of the MSAMS/kg body weight and 7.5 mg of MSAMS-stabilized Ampicillin trihydrate/kg body weight, daily. Thereafter, they were on ANTIVIRT B®, till end of the experiment, at dose of 50 mg/kg, daily. Each of the patients was also placed on the immune enhancing drug (1 tablet, daily), throughout period of the treatment.

Blood samples from the patients were tested for viral loads (HIV) and for CD4-lymphocytes counts, before the treatment and every month. Means of reductions in viral loads were calculated, every month. For rates of viral load-reductions in HIV/AIDS patients treated with the Antivirt® and immune stimulants, percentage of each patient's previous month's viral load by which the load reduced was calculated, every month. One month,

after a patient's viral load became undetectable, he/she was tested by the HIV-antigens test and by the antibody-test to confirm if the infection persists or has regressed.

Monthly mean-viral loads of the patients were plotted on a graph against their mean-CD4-lymphocytes counts. From regression equation of *line of best fit* of the graph, CD4-lymphocytes counts when viral loads of the HIV/AIDS patients would become undetectable (≤19) and when the viral loads would approximate to zero, were calculated. Means of the patients' viral loads and their CD4-lymphocytes counts: before treatment and every month during the treatment were compared for statistical differences, by Analysis of variance.

3. Results

Symptoms complained of, by the patients before the treatment, which included, emaciation, fever, dermatitis, diarrhea and sore throat ceased within first month of the treatment. Mean-viral load of HIV/AIDS patients treated with the ***Medicinal synthetic Aluminum-magnesium silicate***, increased (P= 0.020) from 1820.30 ± 868.75 to 2855.90 ± 960.98 after 1 month before reducing (*P* = 0.0.030) to: 1565.20 ± 743.17 after 2 months; 759.20 ± 473.65 after 3 months; 345.50 ± 115.01 after 4 months; 192.80 ± 97.40 after 5 months; 95.00 ± 55.80 after 6 months; 37.40 ± 26.46 after 7 months and 17.50 ± 16.88 (undetectable) after 8 months (**Table 1** and **Table 2**). There was no significant (P=0.205) difference in the rates (%) of monthly viral load-reduction (45.59 ± 13.41; 51.69 ± 10.73; 47.78 ± 15.44, 45.68 ±11.70; 52.16 ± 8.82) till the 7th month when the rate of reduction improved (*P* = 0.002) to 62.51% ± 5.06% (**Table 3**). Before treatment, their mean CD4-lymphocytes counts was 496.80 ± 194.39 (lymphopenia) and it reduced (*P* = 0.008) to 263.90 ± 149.26 after 1 month of the treatment before increasing (*P* = 0.001) to: 507.90±133.19 after 2 months; 693. 30 ± 114.11 after 3 months ; 840.20 ± 139.41 after 4 months; 1,007.30 ± 163.50 after 5 months; 1,537.10 ± 302.10 after 6 months; 1924.60 ± 247.45 after 7 months and 2707.00 ± 837.87 (lymphocytosis) after 8 months (**Table 4**). There was inverse relationship between monthly means of their viral loads and monthly means of their CD4-lymphocytes counts (**Table 5** and **Figure 1**). Equation for *line of best fit* of a graph of means of their viral loads (Y) on means of their CD4-lymphocytes counts (X) was: Y = 2297.80 − 1.4731X. So, calculated CD4-lymphocytes counts when their mean-viral load would be zero and the counts when the viral load would become undetectable (≤19) were 1559.84 and 1547.01, respectively. HIV/AIDS patients who were on the Antivirt®-immune stimulants regimen had 100% clearance of the infection (antigens negative and antibody negative) one month after their viral loads became undetectable (**Table 6**).

Table 1. Viral loads of HIV/AIDS patients, treated with the *Medicinal synthetic Aluminum-magnesium silicate* (Antivirt®).

Months:	0	1	2	3	4	5	6	7	8
1	895	1384	1026	522	299	120	56	21	14
2	1052	1695	986	420	200	116	47	14	0
3	2830	3640	2411	1011	613	422	210	100	56
4	3359	4620	3021	2012	302	202	80	33	27
5	1630	2822	1040	512	229	114	53	18	0
6	1126	2642	946	416	311	122	49	16	0
7	1056	2300	1000	600	322	130	59	22	14
8	1565	2672	1200	700	401	262	130	51	20
9	1998	3622	2000	699	362	228	160	56	23
10	2692	3162	2022	700	416	212	106	43	21
Mean	1820.30 ± 68.75	2855.90 ± 960. 98	1565.20 ± 743.17	759.20 ± 473.65	345.50 ± 115.67	192.80 ± 97.40	95.00 ± 55.80	37.40 ± 26.64	17.50 ± 16.88

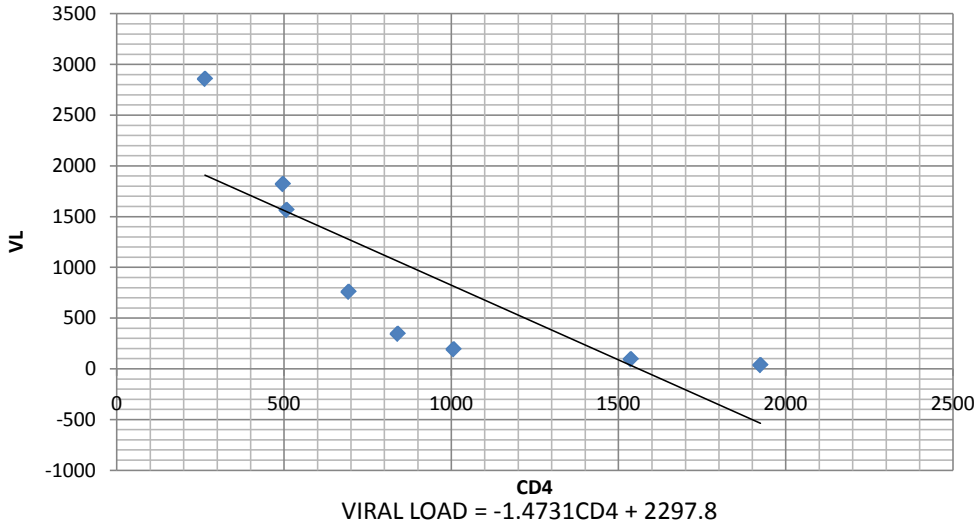

Figure 1. Relationship between viral loads and CD4-lymphocytes counts in HIV/AIDS patients, treated with the Antivirt®.

Table 2. Reductions in viral loads of HIV/AIDS patients, treated with the *Medicinal synthetic Aluminum-magnesium silicate* (Antivirt®).

Months:	2	3	4	5	6	7
1	358	504	233	179	64	35
2	709	566	220	84	69	33
3	1229	1400	398	191	212	110
4	1599	1009	1710	100	122	47
5	1782	528	283	115	61	35
6	1696	530	105	189	73	33
7	1300	400	278	192	71	37
8	1472	500	299	139	132	79
9	1622	1301	337	134	104	68
10	1140	1322	284	204	106	63
Mean:	1290.70 ± 456.83	806.00 ± 403.60	414.70 ± 461.57	152.70 ± 43.60	97.80 ± 47.63	57.60 ± 30.10

Table 3. Rates(%) of reduction of viral loads in HIV/AIDS patients, treated with the *Medicinal synthetic Aluminum-magnesium silicate* (Antivirt®).

Months:	2	3	4	5	6	7
1	25.87	49.12	42.72	59.87	53.33	62.5
2	41.83	57.4	52.38	61.81	59.48	70.21
3	33.76	58.07	39.37	31.16	50.24	52.38
4	34.61	33.4	84.99	32.78	60.4	58.75
5	63.15	50.77	55.27	50.22	53.51	66.04
6	64.19	56.03	25.24	60.45	59.84	67.35
7	56.52	69.23	46.33	59.62	54.62	62.71
8	55.09	41.67	42.72	34.66	50.38	60.77
9	44.78	65.05	48.21	37.02	29.82	34.62
10	36.05	65.38	40.57	49.04	48.04	59.43
Mean	45.59 ± 13.41	51.69 ± 10.73	47.78 ± 15.44	45.68 ± 11.70	52.16 ± 8.82	62.51 ± 5.06

Table 4. CD4-lymphocytes counts in HIV/AIDS patients, treated with the *Medicinal synthetic Aluminum-magnesium silicate* (Antivirt®).

Months:	0	1	2	3	4	5	6	7	8
1	789	566	780	915	1109	1300	1522	1800	2210
2	300	120	423	640	780	980	1946	2432	4680
3	628	295	574	726	836	923	1860	2062	2122
4	270	114	360	580	645	822	992	1923	2043
5	550	220	491	646	729	866	1440	1820	3430
6	601	321	640	822	962	1182	1380	1783	2980
7	750	361	530	720	916	1126	1399	1596	2810
8	450	380	522	730	936	1122	1430	1826	2046
9	340	160	399	560	760	892	1960	2224	2629
10	290	102	360	588	729	860	1442	1780	2120
Means:	496.80 ± 194.39	263.90 ± 149.26	507.90 ± 133.19	692.70 ± 113.34	840.20 ± 139.49	1007.30 ± 163.30	1537.10 ± 302.10	1924.60 ± 47.45	2707.00 ± 837.87

Table 5. Means of detectable viral loads(Y) and means of CD4-lymphocytes counts(X) in HIV/AIDS patients, treated with the *Medicinal synthetic Aluminum-magnesium silicate* (Antivirt®).

Months:	0	1	2	3	4	5	6	7
Y	1820.30	2855.90	1565.20	759.20	345.50	192.80	95.00	37.40
X	496.80	263.90	507.90	693.30	840.20	1007.30	1537.10	1924.60

Table 6. Results of HIV confirmation tests , one month after viral load-regression bellow 20 copies per ml, in patients, treated with the *Medicinal synthetic Aluminum-magnesium silicate* (Antivirt®).

Patients' identity	Tests		
	Agt	Abt	CD4
2	Negative	Negative	4680
5	Negative	Negative	3430
6	Negative	Negative	2980

Agt = Results of antigen confirmatory test. Abt = Results of antibody confirmatory test. CD4 = CD4-lymphocytes counts of the patients.

4. Discussion

That all symptoms the patients were experiencing, ceased when the treatment commenced may be due to enhancement of antimicrobial efficacy of the antibiotic (Ampicillin trihydrate) by the MSAMS [16]. Also, proliferation of the T-lymphocytes to as high as 2707.00 ± 837.87 may have improved immune responses of the patients, against secondary infections.

There are different modifications of the viral load test. Each modification has its own limits of sensitivity. So, it has been recommended that for assessment of efficacy of ARTs, viral loads should be compared with symptoms and/or CD4-lymphocytes counts of treated patients [17]. A modification which detects, as low as 3 copies of RNA per ml of plasma [18] has been developed, for assessing highly active antiretroviral therapies [19] but for this study, the technique available was the one with limit of 20 copies of RNA per ml. So, when any sample that had less than 20 copies of HIV RNA/ml was tested, a figure (<20) appeared and disappeared immediately, indicating that viral load had reduced bellow the test-limit.

Increase of mean viral load from 1820.30 ± 868.98 (before treatment) to 2855.90 ± 960.98, after first month of the treatment suggests that only about 63.74% of HIV-infection load was detected by the test while 36.26% remained "hidden". Destruction of infected cells by Antivirt®-*Nanoparticles*, as suggested by reduction of CD4-lymphocytes counts from a mean of 496.80 ± 194.39 to 263.90 ± 149.26, may have unmasked the "hidden infections" so that they became detectable.

Smallest HIV (immature particle) is 110 - 128 nm while the mature virus is 132 - 146 nm [3]. This small size is what makes HIV able to cross physiological barriers to get to the brain and bone marrow where most ARTs can not reach. But *Nanoparticles* are ≤100 nm. So, every *Nanoparticle* is smaller than the smallest HIV. That means that *Nanoparticles* would have access to any organ HIV infects. AMS-*Nanoparticles* are only 0.96 nm thick [1] which means that they are over one hundred times smaller than the smallest HIV. So, Antivirt®-*Nanoparticle*s would have access to HIV in any organ, including the brain and bone marrow.

Normal range of CD4-lymphocytes counts for healthy human-beings (HIV-negative) is 500 - 1500 per ml of plasma [20]. Lymphocytosis (CD4–lymphocytes counts > 1500) is a normal immune response to viral infections. That this response did not occur earlier in the patients is evidence that they suffered immunodeficiency. So, improvement of CD4-lymphocytes counts from 263.90 ± 149.26 to ≥1500/ml means that the patients had recovered from immunodeficiency (AIDS) characterized by lymphopenia (CD4-lymphocytes counts < 500). Since immunity also clears HIV-infections [21], recovery from immunodeficiency means that there would be synergy between antiviral effects of the Antivirt®-*Nanoparticles* and each patient's immunity.

Significant increase in rate by which viral loads reduced, which occurred in the seventh month, same time recovery from immunodeficiency occurred confirms synergy between immunity and antiretroviral effects of the medicine. Before that seventh month, mean CD4-lymphocytes count (1537.10 ± 302.10) was less than 1547.01/ml calculated as the count needed to reduce mean of the infections-load to <20/ml. With the T-lymphocytes highly mobilized, even if access of the *Nanoparticles* to HIV in any organ/tissue is hindered, immunity would complete termination of the infection.

Since rate (% of infection) of viral load-reduction was statistically constant in first 6 months of the treatment (**Table 3**) it means that access of the Antivirt®-*Nanoparticles* to HIV and HIV–infected cells in different organs/tissues of the patients was not limited, unlike the case of molecules of most other antiretroviral medicines. The 50.90% which is mean of the rates of viral load-reduction suggests that as much as 50% of HIV load in patients treated with the Antivirt®-immune stimulants regimen could be cleared each month of the treatment.

Though rates of viral load-reduction per month did not vary, earlier than 7 months on the medication, total number of the viral RNA mopped out reduced each month (**Table 2**). This suggests that what determines number of viral RNA mopped out is number of contacts between the *Nanoparticles* and the virus. Also, that same dose of the medicine mopped out more viral RNAs when viral loads were high than when they reduced, suggests that increasing dose of the medicine may not shorten duration of the medication needed to achieve termination of the infection. However, since the viral loads reduced every month, it may be possible to shorten the duration by repeating the treatment, once or twice, a day.

By the time viral loads of patients become undetectable (≤19) and their CD4-lymphocytes counts increase to ≥1547.01, at least 50% of the infection could be cleared every month. So, such patients should be treated for 5 additional months, to ensure total clearance of the infection (viral load < 1): ≤9.50, ≤4.75, ≤2.375, ≤1.1875 and ≤0.59375. Ideally, HIV confirmatory tests should be conducted, regularly, on patients undergoing the treatment, till they test negative for the antigens and/or for the antibody.

The 100% regression of all HIV antigens and the antibody in blood of three of the patients, as indicated by the negative results of both the antigens confirmatory test and the antibody confirmatory test means they had become HIV-negative. That they became HIV-negative (zero viral load) just a month after their viral loads reduced to ≤19 copies of RNA per ml of plasma, may be due to increase in antiretroviral activity of the immune cells which had become highly proliferated (2707.00 ± 837.87).

5. Conclusion

Since persons who were HIV-positive (antigens/antibody) and whose CD4-lymphocytescounts were less than 500/ml, tested HIV-negative following treatment with the Antivirt®-immune stimulants regimen and their CD4-lymphocytes counts increased to more than 1500/ml, it has been concluded that the regimen terminates HIV-infections and cures AIDS.

References

[1] Vanderbilt (2012) Report. Technical Information: "VEEGUM—The Versatile Ingredient for Pharmaceutical Formulations. R.T. Vanderbilt Company Bulletin No. 91R, 1984. R.T. Vanderbilt Company, Inc., Norwalk.

[2] Yokoyama, M. (2011) Structural Mechanisms of Immune Evasion of HIV 1 gp 120 by Genomic Computational and Experimental Science. *Uirusu*, **61**, 49-57. http://dx.doi.org/10.2222/jsv.61.49

[3] Gentile, M., Adrian, T., Scheidler, A., Ewald,M., Dianzani, F., Pauli, G. and Gelderblon, H.R. (1994) Determination of the Size of HIV Using *Adenovirus type 2* as an Internal Length Marker. *Journal of Virological Methods*, **48**, 43-52. http://dx.doi.org/10.1016/0166-0934(94)90087-6

[4] Brooks, G.F. (1998) Medical Microbiology. 21st Edition, McGraw Hill Education Inc., San Franscisco.

[5] Cristina, E., Ivan, P. and Kevin, R. (2007) Nanomaterials and Nanoparticles: Sources and Toxicity. *Biointerphases*, **2**, 17-21.

[6] Ezeibe, M.C.O. and Ogbonna, I.J. (2015) Acquired Immune Deficiency Syndrome in Man and Animals—A Review. *World Journal of AIDS*, **5**, 50-57. http://dx.doi.org/10.4236/wja.2015.51006

[7] Ezeibe, M.C.O., Aleeyu, D., Ogbonna, I.J. and Kalu, E. (2016) Clinical Trial of *Medicinal Synthetic Aluminum-Magnesium Silicate* (Antivirt®) on Viral Loads and CD4-Lymphocytes Counts of HIV/AIDS Patients. *World Journal of AIDS*, **6**, 37-41. http://dx.doi.org/10.4236/wja.2016.62005

[8] World Health Organization (2007) Laboratory Guidelines for Enumerating CD4 T Lymphocytes in the Context of .HIV/AIDS.World Health Organization Regional Office for South-East Asia, New Delhi.

[9] Galindo, L.A. and Cereso, P. (2006) Compositional Technical and Safety Specification of Clay to Be Used as Pharmaceutical and Cosmetic Products. *Journal of Renal Nutrition*, **2**, 38-40.

[10] Ezeibe, M.C.O. (2014) The Medicinal Synthetic Aluminum-Magnesium Silicate (Nanoparticles)—Antiviral Agent and Adjuvant to Chemotherapeutics. Federal Republic of Nigeria Patents and Designs Ref No.: NG/P/2012/639.

[11] Murray, K.R. (2000) Harpers Biochemistry. McGraw Hill, New York.

[12] Ezeibe, M.C.O., Ngene, A.A., Kalu, I.K., Ezeh, I.O., Mbuko, I.J., Ekwuruke, J.O., Anene, I., Amechi, B., Olowoniyi, P. and Ifekwe, I.F. (2014) Assessment of Antiretroviral Effects of a Synthetic Aluminum-Magnesium Silicate. *BJMMR*, **4**, 1672-1679.

[13] Ezeibe, M.C.O., Ijabo, O., Uzopuo, C., Okoroafor, O.N., Eze, J.I. Mbuko, I.J., Sanda, M.E., Animoke, P.C. and Ngene, A.A. (2011) Effects of Aluminium-Magnesium Silicate on *Newcastle Disease Virus* and on Recovery of Infected Chicks. *International Journal of Biological and Chemical Sciences*, **5**, 825-829. http://dx.doi.org/10.4314/ijbcs.v5i2.72160

[14] Ezeibe, M.C.O., Nwaogu, I.C., Nwaigwe, A.N., Okoroafor, O.N., Eze, J.I. and Ngene, A.A. (2010) Aluminum-Magnesium Silicate Inhibits *Canine parvovirus* and Cures Infected Dogs. *Health*, **2**, 1215-1217. http://dx.doi.org/10.4236/health.2010.210179

[15] Ezeibe, M.C.O., Mbuko, I.J., Okoroafor, O.N., Okonkwo, A.C., Animoke, P.C., Orajaka, L.J.E. and Ngene, A.A. (2009) *In Vitro* and *in Vivo* Effects of Aluminum-Magnesium Silicate on *Infectious Bursal Disease Virus* in Chikens. *Animal Science Reporter*, **3**, 132-137.

[16] Ezeibe, M.C.O. and Ogbonna, I.J. (2015) Enhancing Efficacy of Antimicrobials with the Medicinal Synthetic Aluminum-Magnesium Silicate, for Prevention and Treatment of Resistant Infections. *BJMMR*, **9**, 1-8. http://dx.doi.org/10.9734/BJMMR/2015/17768

[17] NAM (2016) Types of Viral Load Tests. www.aidsmap.com

[18] Marck, F., Werner, H., Alex, K., Peter, O., Milos, O., Ruedi, L., Rainer, W. and Richard, W.C. (1999) Highly Sensitive Methods for Quantitation of Human Immunodeficiency Virus Type 1 RNA from Plasma, Cells and Tissues. www.jcm.asm.org

[19] Ezeibe, M.C.O. and Ogbonna, I.J. (2016) Medicinal Synthetic Aluminum-Magnesium Silicate $\{Al_4(SiO4)_3 + 3Mg_2SiO_4 \rightarrow 2Al_2Mg_3(SiO_4)_3\}$—A Highly Active Anti-Retroviral Medicine. *World Journal of AIDS*, **6**, 42-46. http://dx.doi.org/10.4236/wja.2016.62006

[20] Ashwini, S., Madhuri, T., Philip, R.A. and Ramesh, P. (2010) A Review on Peripheral Blood CD4-T Lymphocyte Counts in Healthy Adult Indians. *Indian Journal of Medical Research*, **132**, 667-675.

[21] World Health Organization (2004) Consultation on Technical and Operational Recommendations for Scale-Up of Laboratory Services and Monitoring HIV Antiretroviral Therapy in Resource-Limited Settings. WHO Office, Geneva.