SUMMARY

This thesis is a rigorous and detailed study of the biophysical aspects of paralysis. Paralysis (Hemiplegia and Paraplegia) using highly sophisticated spectroscopic and immunophysical techniques to unfold the mysteries of these complex body disorders. Which has emerged out of clinical and physical examinations of 150 cases and hard-core experimental investigations of 75 samples made during the last four and half years, deals with several facts of these unresolved, ill-understood and poorly comprehend neurophysical riddles and their manifestations.

An introduction of paralysis (Hemiplegia and Paraplegia) and related neurological perturbations is given in chapter 1. This chapter describes mental changes in paralysis in brief. Introduction of paralysis Hemiplegia and Paraplegia and its different types, definition, causes, symptom, complication, transmission, prevention, diet treatment complication are described as a prelude to several complex experimental studies reported in the subsequent chapters. This chapter also includes the social aspects of paralysis and procedures for care of paralytic patients.

In chapter 2, we report our studies on the process of immunodulation. Level of immunoglobulin G (IgG), immunoglobulin M (IgM) and immunoglobulin A (IgA) in paralysis (Hemiplegia and Paraplegia) have been measured by Mancini’s radial immunodiffusion technique. A comparison of these findings with those reported in case of paralysis reveals several salient features pertaining to immunomodulatory aspects of nociceptors. Possible role of neurotransmitters in the variation of immunoglobulin level is also discussed. In the diagnosis of paralysis, study of IgG, IgA and IgM level could be used as diagnostic parameter. Changes in the molecular structure of IgG also support the diagnosis of paralysis. Lowering of IgG level after successful anti-convalsant therapy could be used as prognostic index.
All the three immunoglobulins are found to be highest in paralysis. IgG is minimum in normal healthy controls. The mean level of IgM is double in normal healthy control as compared to diseased person and the mean level of IgA is near about to diseased. In normal controls mean IgA level is 2.836 gm/L, while in paralysis it rises to 2.820 gm/L. IgG level in normal controls is 17.244 gm/L. While in paralysis it becomes 17.278. IgM level in normal healthy cases is 2.427 gm/L, while in paralysis it rises to 1.556 gm/L.

A multiple correlation coefficients ($r_{AG}$) in paralysis is found to be 0.563, while the regression coefficients ($b_{AG}, b_{GM}, b_{AM}, b_{MG}, b_{AM}, b_{AG}$) are found to be 0.066, 4.224, -4.303, -0.015, 0.674, -0.153 respectively. The coefficients of correlation $r_{AG}, r_{GM}$ and $r_{AM}$ are found to be 0.530, -0.025, -0.321 respectively. It is found that the partial correlation between IgA, IgM, on one side and IgG on the other side ($r_{AM,G}$) is -0.226.

We present the statistical analysis of the measured levels of IgA, IgG and IgM pertaining to paralysis and by using $t$-test and standard probability tables. Null hypothesis stands for a working assumption that the two sets of values are identical and the difference between them is statistically insignificant. The variation of IgA, IgG and IgM in paralytic disorders also presented. Paralytic attacks or their treatments seem to have a role in the homeostasis of the immune system, at least in humoral immunity. However, the alterations are slight and do not appear to generate clear-cut immune perturbations. These are likely to be related in some cases with the causative mechanism of paralysis. Approximately 20 percent in all cases regardless of the treatment used Fruit, vegetables, whole grains, nutrition's supplement drinks, green tea, barley to increase the level of immunoglobulins.

According to Amman and Honc the maintenance of cellular immunity is one of the criteria for the diagnosis of the convulsive seizures. Patient having ataxia-
telangiectasia and secondary IgA deficiency also show abnormal cellular immunity. Earlier authors regard that the cellular immunity reflects more extensive abnormalities in the immune activity. Characteristic clinical manifestations of IgA deficiency do not appear and their association with pathologic conditions is highly variable.

Our findings are significantly different compared to those of Anderson and Mosekilde. As our normal (control) values agree with those of Anderson & Mosekilde, the possibility of any experimental artifact coming into picture is also far remote.

Studies on complement C3 and C4 in paralysis and healthy controls are presented in chapter 3. Calculations made regarding the neuron-sIGNALS and neuropartition have a strong potential in neurosurgery. Our can decide about the energy needed to excite a peculiar neuron in the sophisticated process of neuron stimulation. Work can also be useful in several complicated neurological disorder.

C3 and C4 complements were measured in selected well defined 15 patients of paralysis (Hemiplegia and Paraplegia) and 09 healthy controls. Chapter 3 gives our data on cases of paralysis (Hemiplegia and Paraplegia) and healthy controls. Our findings are based on a total number of 24 cases. C3 values in paralysis (Hemiplegia and Paraplegia) are found to lie between 1.07 gm/L to 2.28 gm/L, while C4 is observed to be within 0.09 gm/L to 0.48 gm/L. C3 is found to be significantly higher than C4 in all the cases of paralysis. R_{34} is found between3.4 to 11.88. The average value of C3/C4 corresponding to all the cases of paralysis is found to 5.94.

We get very interesting results which shows that R_{34} falls from 6.33 in normal healthy controls to 5.94 in paralytic cases. Reduction in the value of R_{34} appears to be related with the occurrence of paralysis while a paralytic patient must be given such a kind of drug treatment which may increase his/her R_{34} factor. The value of R34 (6.33) in our normal healthy controls is close to that of 5.89 as reported by Moore.
Our main findings are the coefficients of correlation between the concentrations of C3 and C4 complements which is found to be 0.464 (positively correlated) in paralysis while in normal healthy controls it is found to be -0.026 (negatively correlated). We therefore conclude that the concentrations of these two complements C3 and C4 are positively correlated in paralytic disorders. A therapy based on pharmaceuticals aiming at reduction or increase of any of these complements must take into account the impact it will have on the other complement.

At this stage it becomes absolutely essential to examine the role played by complements in paralysis, keeping in view the results of present experimental findings. Disorders associated with the complements. They constitute a very important part in the saga of human diseases. Food (protein rich) taken as properly (regularly) to increase the level of complements.

In chapter 4, we present our studies on the levels of trace elements in normal healthy controls and patient having paralysis (Hemiplegia and Paraplegia). All taking standard anti-concussive drugs and food which we control the trace level of patient level of Zn, Cu, Fe, Ca, Mg, Na and K in the sera of paralytic (Hemiplegia and Paraplegia) and healthy control persons were examined using the spectrophotometric technique.

Results for Zn, Cu, and Fe obtained by us are summarized in Table 4.1. We have find that the mean Zn level (1.609) becomes almost high in paralysis compared to normal healthy controls (1.026). Mean level of Cu (0.150) becomes higher in paralytic patients. The mean value of Fe (1.544) remains almost high in paralytic patients. Student t-test is applied to all these results (Table 4.4) and we have calculated the Zn, Cu and Fe values at 2%, 5%, 10% and 50% level of significance.

Our work is more extensive because we have carried out studies on Fe level also and examined all the possible double, partial & multiple triple correlations between Zn, Cu, and Fe levels. From Table 4.3 it is obvious that-

\[ r_{CuFe,Zn} \leq \ldots \leq r_{ZnFe,Cu} \]
Values of $r_{CuFe,Zn}$ shows a correlation between Cu, Fe and Zn but the multiple correlation coefficient $r_{ZnCu,Fe}$ is found to be rather poor. Double correlations $r_{CuFe}, r_{ZnCu}, r_{ZnFe}$ are found to have the following trend: $r_{CuFe} > r_{ZnCu} > r_{ZnFe}$.

$r_{ZnCu}$ and $r_{ZnCu,Fe}$ are found to be 0.211 and 0.195 respectively which means that concentrations of Zn and Cu in the paralytic samples are found to be poorly positive correlated. Also, $r_{ZnCu}$ and $r_{ZnCu,Fe}$ are found to be poorly positive correlated. One can therefore say that increasing the Fe level of the patient will also help us in managing the Zn & Cu levels. The values of $r_{ZnCu}$ and $r_{ZnCu,Fe}$ are 0.182 and 0.339 respectively in normal healthy controls. The concentrations of Zn and Cu are rather strongly correlated in paralytic patients.

$r_{ZnFe}$ and $r_{ZnFe,Cu}$ are found to be 0.083 and 0.015 in paralytic patients respectively which means that concentrations of Zn and Fe in the paralytic samples are found to be poorly positive correlated. Also, $r_{ZnFe}$ and $r_{ZnFe,Cu}$ are -0.481 and -0.545 respectively, in normal healthy controls. The concentrations of Zn and Fe are rather strongly correlated in paralytic patients while the concentration of Zn and Fe are poorly negative correlated in normal healthy controls. One can therefore say that increasing the Cu level of the patient will also help us in managing the Zn & Fe levels.

$r_{CuFe}$ and $r_{CuFe,Zn}$ are found to be 0.330 and 0.321 respectively in paralytic samples which means that concentrations of Cu and Fe in the paralytic samples are found to be poorly positive correlated. In normal healthy controls, $r_{CuFe}$ and $r_{CuFe,Zn}$ are found to be 0.224 and 0.361 respectively which is poorly positive correlated. One can therefore say that increasing the Zn level of the patient will also help us in managing the Cu & Fe levels.
Similarly, results for Na, K, Ca and Mg are summarized in Table 4.5. We find that the mean level of Na, K and Ca are nearly equal to normal and the mean level of Mg is high in paralytic patient as compared to normal healthy controls. Student-t test is applied to all these results (Table 4.8) and it is found that there is an appreciable difference between Na, K and Mg values, respectively at 2% level of significance while there is no significant difference between Ca values at 2% level of significance.

Also, we have calculated the possible double partial & multiple triple correlations between the Na, K, Ca, Fe and Mg levels. From Table 4.7 it is obvious that

\[ r_{\text{NaK, Ca}} < r_{\text{NaK, Mg}} < r_{\text{MgK, Ca}} < r_{\text{MgCa, Na}} \]

Values of \( r_{\text{NaK, Ca}} \) shows a correlation between Na, K and Ca concentrations. But the multiple correlation coefficient \( r_{\text{Ca, NaKMg}} \) is found to be rather strong.

Double correlations \( r_{\text{NaK}}, r_{\text{MgCa}}, r_{\text{NaCa}} \) are found to have the following trend:

\[ r_{\text{NaCa}} < r_{\text{NaK}} < r_{\text{MgCa}}. \]

Concentrations of Na and K in the samples are found to be poorly correlated. When we compare the paralytic and normal healthy controls results then we found that in paralytic samples, the coefficient of correlation \( r_{\text{NaK}} \) is -0.146 which is a poor negative correlation while in normal healthy control samples \( r_{\text{NaK}} \) is 0.254 which is a positive correlation. The coefficient of correlation \( r_{\text{MgCa}} \) is 0.463 in paralytic samples while in normal healthy controls it is 0.013. It is obvious that concentrations of Mg and Ca in paralytic samples are strongly correlated than normal healthy controls. \( r_{\text{NaCa}} \) is -0.471 in paralytic samples and in normal healthy controls \( r_{\text{NaCa}} \) is 0.176. It is obvious that concentrations of Na and Ca are negatively correlated in paralytic samples while the concentrations of Na and Ca are positively correlated in normal healthy controls.
$r_{NaK}$ and $r_{NaK,Ca}$ are found to be $-0.146$ and $-0.372$ respectively. One can therefore say that increasing the Ca level of patient will not help us in managing the Na, K levels.

$r_{MgCa}$, $r_{MgCa,Na}$ and $r_{MgK,Ca}$ are found to be $0.463$, $0.283$ and $0.216$ respectively. One can therefore say that increasing the Ca level of patient will help us in managing the Mg and K levels and increasing the Na level of patient will help us in managing the Mg and Ca.

Trace element act as catalytic agents for the enzyme systems for the cells. The role that the trace elements play in enzyme reactions range from weak, ionic strength effects to highly specific associations, commonly termed as metallo enzymes. In the latter, metal is firmly associated with the protein and there is a fix number of atoms per molecule of protein which cannot be removed from this association by dialysis.

The minimum requirements of living creatures for the essential trace elements are commonly expressed in proportions or concentrations of the total dry food taken per day. The maximum intakes of these and other elements which are within tolerable limits are usually expressed similarly. These tolerances are arrived at relating the fertility, growth, health or other relevant criteria to different dietary mineral concentrations.

There are safe dietary levels of potentially toxic trace elements. These depend on the extent to which other elements (having an effect on their absorption and retention) are present. These considerations apply to all the trace elements such as copper (which has been studied in the present work), they are so significant that a particular level of intake of Cu can lead to signs either of Cu deficiency or of copper toxicity (in excess of Cu excess) depending on the relative intakes of Zn or Fe. We have examined all these seven elements and have succeeded in locating the strong correlations between Cu & Fe and also between Cu, Fe and Zn. Both these correlations are $\approx 0.3$.

The copper in plasma exists in two types: (a) firmly bound (b) loosely bound. The strongly bound Cu consist of the blue Cu protein, ceruloplasmin. This is a globulin
having a molecular weight of 151,000. It possesses 8 atoms of Cu per molecule[23]. Ceruloplasim can play only a minor part in the absorption and transport of Cu. It is because the amount of ceruloplasmin Cu exchanged every day is much smaller than the quantity of Cu absorbed from the intestinal tract. The plasma Cu which does not exist as ceruloplasmin is known as direct reacting copper. It reacts directly with dithizone. It is nondialyzable. It has a weak binding with protein probably serum albumin[24-27]. This albumin bound plasma copper is the copper which circulates.

There are several disorders related to deficiency of Cu or with respect to Cu therapy, for examples, anaemia, depressed growth, bone-disorders, depigmentation of hair and wool, abnormal wool growth, neonatal ataxia, impaired reproductive performance, cardiac arrest, cardiovascular defects and gastrointestinal disturbances.

Hypocupremia appears in a number of disordered. The reason in these disorders is not a dietary deficiency of Cu. It may be a defect in ceruloplasmin synthesis, poor absorption and excessive excretion. Hypocupremia is seen some times in young children. Hypoproteinemia, hypoterremia and anaemia also appear along with this disorder.

Poisoning due to Cu can happen as an industrial hazard in workers engaged in Cu mining or processing. Wilson’s disease, have excessive concentrations of Cu in the tissues, originates due to the metabolic defects resulting from absorbed Cu and indigestion of excessive amounts of Cu.

Sodium is crucial for maintaining the health of every cell in the human system. It permeates the fluid between cells (often called the "extracellular fluid") and potassium exists mainly on the inside of the cells (in the intracellular fluid). These two minerals need to be in constant dynamic balance so nutrient and waste can take place across cell membranes. If either of these minerals is deficient or in excess, cell permeability becomes compromise and the health of all the cells suffers.
Calcium (Ca) is a key constituent of bone & teeth; essential for vital metabolic process such as nerve function, muscle concentration and blood clotting. Calcium performs diverse biological functions in the human body and is essential to human health and well-being. It serves as a second messenger for nearly every biological process, stabilizes many proteins, and in deficient amounts is associated with a large number of diseases and disorders. Calcium deficiency is a major problem while calcium excess a rare one.

Mg is essential for healthy bones, function of muscle and nervous tissue; need for functioning of approximately 90 enzymes. The content of Mg in the entire body of the average sized adult is about 25 gm. It is the fourth most abundant cation being exceeded only by calcium, sodium and potassium. Thus it is hardly correct to regard Mg as a trace element. Mg performs a large number of functions. Inadequate magnesium intake frequently causes muscle spasms, and has been associated with cardiovascular disease, diabetes, high blood pressure, anxiety disorders, migraines, osteoporosis and cerebral infarction.

In order to comprehend the basic process and the causative processes responsible for paralysis (Hemiplegia and Paraplegia), we have investigated the peculiar characteristics of paralysis serum using nuclear magnetic resonance (NMR) spectroscopic technique in chapter 5. High resolution NMR studies are carried out on screen of patients suffering from paralysis (hemiplegia and paraplegia). Results are compared with normal. The observed chemical shift (δ) in water peak in all cases was observed in all pathological conditions.

We have applied NMR spectroscopy to serum of paralytic patient and findings are reported in the table form. We have compared our data the normal healthy controls. A magnificent use of NMR lies in fact that, because of chemical shift, amino acids can be identified and isolated in the spectra of protein. It will be known in NMR theory that
the motion of any type such as rotatory and translatory reduces the width of the resonance line. Due to this property motional narrowing feature starts and high resolution NMR is required.

The analysis of spectrum of NMR for blood serum requires dealing with the effect of protein and other large molecules. NMR spectroscopy is the technique of spectroscopy that can provide details structural information about macromolecules at atomic resolution. Many scientists characterized small molecules by using empirical rules associated with the study of chemical shift regarding the conformation of the structure of the molecule. It has been seen that most of the amino acid spectra can be understood on the basics of first order effects. The chemical shift is large then the spin-spin coupling. In the study amino acids while the chemical shift is not large compared to the spin-spin coupling. We can compare the chemical shift and spin-spin interaction in this situation. If we have a situation that lies between these two experiments there are many amino acids the spectrum may have first and second order both.

If we apply a large field to the system and we find a situation for the chemical shift, which is proportional to the field strength and kept spin-spin coupling as constant.

Proteins play a major role in the billions of process which occur in the body. It includes the developments of muscles, skin, and digestion of food, growth of cells and the germination of human emotions. These cells have a tendency of produced proteins continuously. NMR may help in the study of the determination of the structure of proteins. This technique can detect and quantify folding and confirmation change in proteins, while simultaneously providing detail structure information.

The NMR spectra of the normal persons and paralytic patients were recorded on AvBruker 500 MHz NMR Spectrophotometer in central NMR facilities in IIT Roorkee.
Our main findings are that the chemical shift in water peak (D2O peak) in all the cases may be due to pathological conditions. We have found peaks in all the spectra recorded on NMR due to the formation of some active centre’s such as paramagnetic ions. The comparison of the diseased sample spectra with the normal healthy controls reveals some characteristics of the disease.

It is possible to identify the nature of the pathological disorder by looking at the NMR spectrum of patient’s blood. It has been found that the peak intensities, line shapes and chemical shift were different. These basic properties suggest that there are perturbations present which vary from sample to sample. These perturbations are due to the paramagnetic ions, in some cases such as Mn++, Mg++ and Ca++ as well as due to the presence of some unpaired electrons. The chemical shift suggests a transfer of electrons in enzymes and proteins in paralytic disorder. The dipolar anisotropy of unpaired electron causes a shift in line position. We have found the present study that the groups related to serine, Threonine and histidine were completely absent in all the paralytic disorder cases.

In chapter 6, IgG extracted from the blood of paralytic patient (Hemiplegia and Paraplegia) cases has been examined by the Ultra-violet spectroscopy. The prime object of the present work is to locate the chemical alternation in paralysis (Hemiplegia and Paraplegia). We are interested in helix coil transitions and the change in the content of amino acids in paralysis. Our ultimate goal is to comprehend the role of possible causative factors in the manifestation of paralysis. The ultra-violet spectra of the IgG samples extracted from the normal persons and paralytic patients, were recorded on Shimadzu UV visible recording Spectrophotometer UV-1800. Ultraviolet absorption spectra of IgG of paralytic patients were recorded and compared with the normal healthy control.
The absorption spectra of proteins are of great interest and made easy to study. There is a broad band with a peak found in the spectrum of protein at 280 nm and a minimum at about 250 nm on the shorter wave length side. This band may be correlated with the presence of tyrosine tryptophan and phenylalanine.

Firstly we examine the IgG of paralytic patient then we have compare our result with normal healthy control we found that the absorption band which is found at wave length above 280 nm is due to on protein occur chromophore.

Members have U.V. absorbance spectra typical of nucleoproteins, with a maximum at 260 to 262 nm and a minimum at 240 to 246 nm. This may be associated with the presence of purine and pyrimidise nuclei. Some of spectra reported for proteins end at 235 nm on the shorter wavelength side of the main 280 nm peak. The absorption curves rise rapidly in this region. Steep rise may provide some information regarding the region of continuous absorption. Specific structure of a protein distinguish it from other compounds is the presence of a large number of peptide bonds. UV spectra of anhydrides, esters and fatty acids and acid chloride show that a board band in the region of 200 nm ultra violet spectroscopic studies below 240 nm are of interest. Ultra violet spectroscopic studies of amino acids were also carried out by Coulter, Betal and they have reported that aliphatic amino acids do not show absorption above 250 nm. Tyrosine tryptophan and phenylalanine show spectrum of absorption in the same spectral region as the proteins. The ultra violet absorption band of the proteins has in consequence been attributed to the content of the amino acids. It has been seen that the peptide group of the protein main chain absorb the light energy in the range from 180 nm to 230 nm.

Aromatic side chains of tryptophan tyrosine and phenylalanine also absorb light in this region. These residues of proteins may absorb light in the region from 240 nm to 300 nm. Disulfide bond also shows an absorption character near to 260 nm. The aromatic amino acids do not absorb any light above 310 nm. The protein absorbance above 310
nm is zero. Those proteins without tryptophan residues do not show any absorption spectrum above 300nm.

There is a region which starts from 285 nm to 295 nm shows several bands which originate from the tyrosine and the single tryptophan residue.

We would like to make a point of inference that at 205 nm the side chains of amino acids make relatively small contribution to the total absorption of proteins.

Absorption coefficient for the peptide bond is of an order of magnitude many times higher than that of amide or carboxylic group.

If we would like to give more attention with the band which is found in the range from 201.39 nm to 209.00 nm then it can be said that the side chains of amino acids give a definite contribution to the total absorption of proteins.

Our main findings are that tryptophan and phenylalanine peaks are coming in patient suffering from paralysis and tyrosine content diminishes highly in paralytic patient. We have succeeded in obtaining our aim of studying IgG concentration. The appearance or disappearance of these specific paralytic signals helps us in navigating the therapeutical management of the paralysis disorders.

Present work has a strong potential indicating the diet which must be taken by the paralytic patients and in navigating the therapeutical management of the patient. Structural change occurring in IgG in paralysis (Hemiplegia and Paraplegia) have been examined using FTIR spectroscopic technique (Chapter 7) present work shows that in paralysis.

We aim to investigate the nature, strength and situation of chemical bonds in the IgG molecule in these disorders. We are interested in comprehending hitherto non-understood changes, which are responsible for deteriorating the situation of paralytic disorders. For this purpose, we have used FTIR spectroscopy, which has been a powerful
tool for studying the side chain conformations. FTIR has a strong potential for study of the hydrogen bonds of proteins and polypeptides.

Firstly, we examine the IgG of paralytic patient then we have compared our result with normal healthy controls. We found that the bond range from 1151.94 Cm\(^{-1}\) to 1156.02 Cm\(^{-1}\) due to phospholipids (P-O-C) group appear in some of paralytic patient. Theses band are absent in normal healthy controls. The vibrational energy of these phospholipids band is almost constant and in approximately equal to 13.87 KJ Mole\(^{-1}\). The force constant found to be range of 455.04 Cm\(^{-1}\) to 458.28 Cm\(^{-1}\). Hydrocarbon, carbide and peroxide were also present in the diseased and normal healthy controls. The absence of few bands in these disorders is the distinct feature of these samples. Amide IV band is also found in paraplegic patient at 767.76 Cm\(^{-1}\) and 771.97 Cm\(^{-1}\). The vibrational energy is found 9.18 KJ Mole\(^{-1}\) and 9.23 KJ Mole\(^{-1}\) and force constant is found 32.30 Nm\(^{-1}\) and 32.65 Nm\(^{-1}\).

Nociceptive networks have very strong affinity with the biochemical aspects of the human body and reflect the entire functioning or malfunctioning of the physiological system. Due to this main fact we have used vibrational spectroscopy in the present research article.

The amide bands are called vibrational bands and are complex in nature. Amide bands depend on the details of the force field, nature of side chains and hydrogen bonding.

Amide I band is found intact clearly in all the cases of paralysis. The amide I band is found in the range (from 1588.73 cm\(^{-1}\) to 1649.83 cm\(^{-1}\)) in paralytic patients, are close to the absorption frequencies of the deuterated polypeptides having the \(\beta\)-conformation and have also been observed in proteins which contain a part of \(\beta\)-structure. The carbide compound \(C \cdot C\) band is found to appear in all the paraplegic
and hemiplegic patients. This band is found in the range from (1350.13 cm\(^{-1}\) to 1383.56 cm\(^{-1}\)).

The band due to P-O-C (phospholipids) is found in some of the cases of hemiplegia and paraplegia. These frequencies are found to be absent in all the cases of normals. The disappearance of this band in normals is a distinct feature of these samples. The band due to O-O (peroxide) compound is found intact in range from 1041.62 cm\(^{-1}\) to 1119.18 cm\(^{-1}\) in all the cases of paralysis and healthy controls. The vibrational energy is 12.45 kJ mole\(^{-1}\) and force constant is 511.41 Nm\(^{-1}\). A band called amide IV due to N-H is found only in the two cases of paralytic disorder at (767.76 cm\(^{-1}\) and 771.97 cm\(^{-1}\)).

Our main findings are that FTIR spectroscopy is a well established experimental method for studying the structural composition and dynamics of proteins. A correlation between the spectra and protein structure has been well documented. These spectra have also given information on the protein stability and dynamics. These spectra are complex in nature. Side chain absorption is to be taken account in the analysis of protein spectra.

We would like to add here that some amino acid residues, especially arginine, asparagines, glutamine, asparatic and glutamic acids, lysine, tyrosine, histidine and phenylalnine have very fast absorption in the amide band region.

Many diseases generate specific changes in the metabolic pattern of blood or other body fluids. These changes may produce particular spectroscopic indications which can be used for identification and classification of the diseases in seconds to minutes.

Amide IV band is also found in the present work only in the two cases of paralysis. Absence of this band in other cases is a remarkable change. These patients were followed by the proper medication with standard drugs.

The bands due to phospholipids [P-O-C] are found in the paralytic patients and absent in healthy controls. This technique is able to detect these bands and give clear cut indication something is hidden inside the IgG molecule.
In the present work we have succeeded in identifying the basic atomic level transformations occurring in different neurological disturbances. It is possible, on the basis of our investigations, to use this technique for differential diagnosis of the various pathological disorders and to some extent the stage of the disease. It has already been pointed out that the infrared spectra exhibit the presence of specific bands peculiar to particular disease paraplegia as compared to the normal samples. The FTIR experimental findings show that in these neurological perturbations, stability of the secondary structure is completely disturbed. It follows that a large extent of conformations of the two parts of IgG is independent of the intact IgG molecule. We conclude in the last this method is reliable and efficient to detect the changes at the molecular level. Specific changes could be seen in the structure of protein molecule with the help of detailed theory of infrared spectroscopy measurements.