

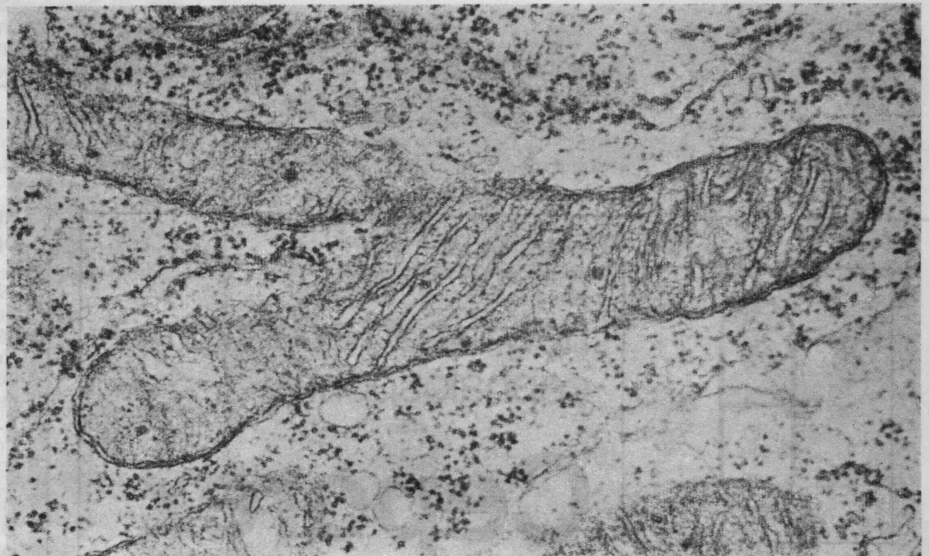


MITOCHONDRIA—IN HEALTH & IN DISEASE

Y. W. W.

Mitochondria are intracellular organelles varying both in size and shape between and within species. Each mitochondrion is about 2 microns to 7 microns long and is enveloped in a double membrane whose inner layer is folded into a system of ridges or cristae. The matrix of the organelle can be termed structureless with dense granules of unknown function present occasionally. The mitochondrion is a fascinating organelle in that it responds to changes in salt concentration osmotically. The membrane probably also has an important role in controlling the uptake and release of metabolites. Active ion transport has been reported to take place across its membranes. Mitochondria are in unceasing motion and they are found in plentiful amount in heart muscle and actively secreting glands as well as in many other organs and tissues. This is no doubt related to their activities and one may be aware of the fact that the mitochondria provide the energy needed in activities.

Mitochondrial enzymes can be studied in detail because the organelles are sufficiently dense and strong to allow separation from the rest of the cell by centrifugation. In this way a few enzyme systems have been identified but for the time being only the discussion of Krebs's cycle and the electron transfer chain is attempted. As Fig. 1 reveals the enzymes are put (hypothetically) in an orderly fashion on the inner membrane of crista and the substrate Pyruvate is completely oxidised into 3 molecules of Carbon Dioxide.



Thus one sees (Fig. 2) for one pair of hydrogen removed during the Krebs's Cycle in form of NADH and H⁺ passing through the electron transfer chain (electron transport system) 3 moles of ATP are released and these provide the source of energy for bio-

cases and animal experiments is not known. The adrenal cortex is renowned by the presence of a curious type of mitochondria — "Honeycomb" mitochondria which are believed to be responsible for the synthesis and secretion of the adrenal corticosteroids. The mitochondria and their associated enzymes are also target to action of a number of drugs for instance the anti-pyretic salicylates uncouples oxidation-phosphorylation by its action on the electron transfer chain and the phosphorylation process.

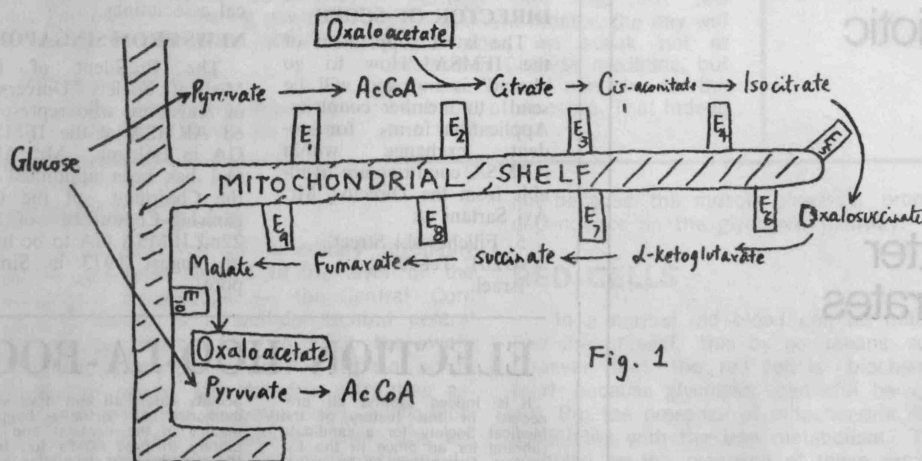


Fig. 1

INFECTIONS

Pathologically the mitochondria are also affected in a diversity of ways. The disease Plague kills by its toxin which does not interfere with the ATP synthesis process but rather inhibits the electron transfer chain per se. Absorption spectra analysis made by Kadis and others showed that addition of toxin caused oxidation of cytochromes a, a₃, b and c. This indicates that the toxin exerts its effect on the electron transfer chain at a point before the reaction catalysed by cytochrome b, i.e. somewhere between NADH or succinate and cytochrome b. Later they discovered that the site of action is Complex I. The term Complex refers to several respiratory carriers taken together. Complex I refers to NADH dehydrogenase flavoprotein, non-heme iron and CoQ. The rabbits were found to be insusceptible to Plague toxin because their mitochondria are somehow able to exclude the toxin. The bacillus causing diphtheria — *Corynebacterium diphtheriae* also affects the cytochrome oxidase system but the precise mechanism is unknown. It may also operate on a basis similar to the Plague toxin.

(Continued on page 3)

POWER PLANTS

One may ask what this complex chain of reaction is for, no doubt it accounts for the oxygen uptake and the carbon dioxide output of external respiration. However this is unimportant as compared with the energy "synthesizing" process which enable for example the heart muscle to work and maintain the circulation and the glands to secrete. This process is accomplished through the presence of an electron transfer chain.

logical activities of the cell. Thus the mitochondria are also named "power plants" of the cell.

HORMONES

Physiologically many hormones act on the mitochondria. Thyroxine swells the mitochondria and Parathyroid hormone also alters the ion transport across the mitochondrial membrane in vitro. But the exact relation between these observed phenomena and the physiological role manifested on human clinical

QUOTABLE QUOTE

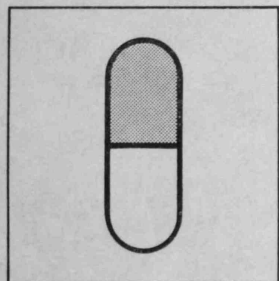
A. T.



When you sit with a nice girl for two hours, you think it's only a minute.



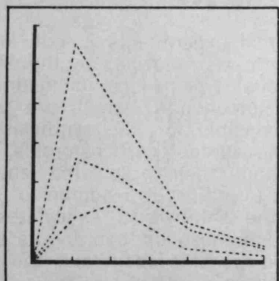
But when you sit on a hot stove for a minute you think it's two hours. That's Relativity — Albert Einstein



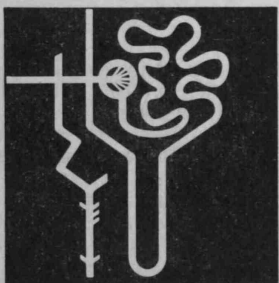
new broad-spectrum cephalosporin

Ceporex

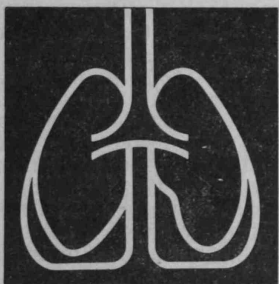
(cephalexin)



the better absorbed oral antibiotic



gives better success rates



Glaxo

Glaxo Hong Kong Ltd.
9th Floor, Block B,
Watson's Estate, Hong Kong.

FLASHLIGHT ON ARMSA

NEWS FROM THE DIRECTOR OF S.C.O.P.

The theme of Medicasia 1973 is "Population and Family Planning". Members are urged to contribute articles on this topic or any other topic of interest to medical students as soon as possible. The National Vice-Presidents or sub-editors will be responsible for the collection of the articles. The articles should be sent to the Director of SCOP, Mr. David Scrimgeour.

His address is:

Flat A2-3,
100, Arden Street,
North Melbourne, Vic
3051
Australia.

NEWS FROM THE DIRECTOR OF SCOPE

The latest supplement of the IFMSA 'How to go abroad' is out and will be sent to member countries. Application forms for student exchange within ARMSA countries are available from the Director, Mr. Avi Sartani at:

5, Filichowski Street,
69201, Tel-Aviv,
Israel.

NEWS FROM ISRAEL — Community Health Project.

The above project adopted as an ARMSA project will be organised in co-operation with the Faculty of Social Medicine, University of Tel-Aviv. It will start on February 1st 1973, each period lasting 5-6 weeks and there will be participation of at least 5 students per period. They will get free board and lodging, journeys within Israel, lectures in community health in English and will work in community health centres.

Those students wanting to join this project are requested to send in their applications to Mr. Avi Sartani (address above) with the official approval of their medical associations.

NEWS FROM SINGAPORE

The President of the Medical Society University of Singapore who represented ARMSA at the IFMSA GA in Bologna, Mr. Alex Ooi has been appointed as the Chairman of the Organising Committee of the 22nd IFMSA GA to be held in August 1973 in Singapore.

ELECTION HOO-LA-BOO

It is indeed against all precedent in the history of the Medical Society for a candidate running for an office in the Executive Committee to be voted down. This year the traditional one-man-one-post standard ipso facto practice seemed, at one stage, to be relinquished when at least three parties were interested in the post of Chairman. But one by one the intending contestants dropped out of the race, leaving one cabinet making the Society elders quite certain of a monotonous but surely smooth transition from one session to the other. However, the one man race for the Chairmanship this year turned out to be as unimaginable as could be.

First, in the EGM on Nov. 21, 1972, the only candidate for Chairman, Mr. Lam How Mou, was voted down by an outstanding margin of 20 votes (68 for and 88 against). This EGM was attended by perhaps the biggest crowd, ever totalling more than 150. The

Society elders all still have vivid memories of virtually begging medics in the canteen and the Library in past AGM's to form the quorum. Four days later, a re-vote was held. A narrow margin of 4 kept Mr Lam from the Chairmanship. (120 for and 124 against) Another massive turnout.

Then the session began without the Chairman and an Emergency Council Meeting decided to re-open nomination and a new way of voting was adopted, general polling instead of an EGM. This experiment died before it started because no one was nominated. The post was again open to nomination for a second time. It makes one wonder why this time general polling is not used for all the virtues that it is said to have in the first Emergency Council Meeting. Maybe this time behind the door efforts have located another candidate. Who knows? For your information the EGM is scheduled on the 18th, Dec.

Introducing — the Chinese Medical Research Centre

Born several months ago, the youthful Chinese Medical Research Centre is the brainchild of a leading local physician, Dr. L.K. Ding. The planning committee also includes three other registered medical doctors, one educationist, one D.Sc., one Ph.D. and one Chinese herbalist.

Among the objects for which the Centre is established, are to promote the study of Chinese medicine and to increase medical knowledge in general in cooperation with the medical profession throughout the world; and to establish a centre for research on Chinese medicine and acupuncture.

It is the latter objective that the Centre is now in active pursuit. Working in close association with really well-experienced authentic acupuncturists direct from Mainland China, Dr. Ding and his colleagues attempt to nail down the limitations of acupuncture. What actually does acupuncture cure and what does it not? Can the validity of these cures be fully documented? While it may be beyond a doubt that acupuncture works in many cases where traditional Western medicine fails, there is still a need to separate the myth from the fact.

With the help of acupuncture anaesthetists from the Mainland, it is to be hoped that acupuncture anaesthesia may soon be documented in the Colony.

Other recent activities of the Centre include a talk from a visiting doctor from Britain, Dr. Felix Mann M.B.B.S. (Cambridge) who has been practising acupuncture in England for 15 years and has gained some insights as to the mechanism of its healing power in known terms of Western medicine.

"Writing on the Wall"

While Dr. Ding acknowledges the belief that there should be no na-

tional boundaries in the treatment of diseases, he points out that the existence of unqualified personnel in the practise of traditional Chinese medicine indicates the need for some standardization.

Further, Chinese medicine as it is practised here requires some form of systematization. Yet the investigation into and the use of acupuncture, herbs and other traditional Chinese treatment may well point a way in which the medical needs of poorer and more populated countries may be met. Acupuncture, in particular, is inexpensive, compared with other sophisticated medical facilities.

According to Dr. Ding, one can read from the writing on the wall that by this integration of traditional and Western methods, Red China probably leads the world in the provision of efficient medical care, distinguished not by the sophistication but by the simplicity and effectiveness of its methods and facilities.

What Medical Students Can Do

It is only a few decades ago that Chinese doctors after their training in Western medicine would swear to wipe out traditional Chinese medicine altogether. Some of these attitudes of suspicion and mistrust still linger in the older generation of medical practitioners.

What medical students can do at present is to keep an open outlook. They should be encouraged to express an interest in Chinese medicine. If they are interested, they are welcome in the participation of some of the programs of the Centre.

Perhaps with the next few generations of doctor, the day will come when we speak not of western or Chinese medicine, but only one type of medicine for the treatment of diseases. That indeed is a fond vision . . .

I ONCE KNEW

I once had a soft spot
Which tinkled whenever she made a sign
Now it's turned dead
It refuses to react
It has responded too much

People meet
They know
They love
And then they drift apart
It seems to be cruel
But that's God damn true

Though it's such a heart
I'm still glad
It I once knew
Cos some people meet
And some people love
But they never know
What it's all about
So though it's a defeat
I'm glad
I knew
I did
Even it's never complete

T. KWAN

(Continued from Page 1)

MUSCLE CELLS

In a rare type of hereditary myopathy which has been studied at the level of the electronic microscope — the Central Core Disease, there is a well-demarcated central area in the muscle fibre in which the myofibrils are closely packed leaving little or no interfibrillar space. Mitochondria with their associated oxidative enzymes and amylophosphorylase activity are absent. Here the absence of mitochondria cannot of course fully account for the muscle weakness. The absence of the phosphorylase is even more import-

ant because the muscle shows a prominent dependence on the glycolytic pathway.

RED CELLS

In a normal red blood cell no mitochondria are present, this by no means suggest however that the red cell is biochemically inert because glycolysis can still be carried out. But the presence of mitochondria may be associated with the iron metabolism. This is revealed by the presence of these organelles in the erythroblasts and also in the sideroblasts in certain cases of anaemia. The pre-

sence of large amount of iron in the ferritin form in the mitochondria of the above cases supports the suggested possibility.

LIVER CELLS

In carbon tetrachloride and alcohol injured liver cells the mitochondria also show changes. But the association between these and the necrosis and fatty changes observed is unclear because other subcellular components apart from the mitochondria also suffer from tremendous changes. Cyanide poisoning in general causes swelling and disappearance of mitochondrial cristae. Here cyanide also exerts an action on the cytochrome-cytochrome oxidase system i.e. part of electron transport system. Others have described altered mitochondria in cases of chronic bronchitis in the ciliated epithelial cells.

Summing up, one must be careful in interpreting the mitochondrial changes in various pathological states. One must remember that mitochondrial alteration or destruction may not be related to the pathological process in question: the mitochondria being exceedingly sensitive intracellular organelles may undergo non-specific forms of changes merely indicating cell injury has taken place.

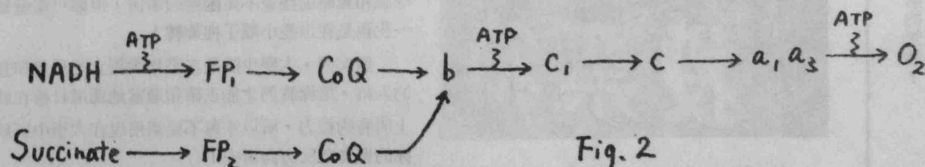


Fig. 2

啟思

文明的下午

斯

家裡靜悄悄的沒有一個人影。半躺半倚在安樂椅上，史東的新小說翻到了第二頁。牆上電鐘的指針忽然停在二時十七分上，室內清冷的空氣迅速地消逝，斗大的一顆汗珠滾下了面頰，我衝到了街上。

當騎陽的第一絲烈焰灼上我的皮膚，我本能地跳上一輛空氣調節的街車。口袋裡原來只有兩隻硬幣，我想像司機找贖時難看的咀臉，想着假使我身懷絕技，準會教他雙手奉上。忽然發覺專門推銷暴力的百萬大導底魂魄，在向我稱許地微笑。

我跌進了狂潮中。黑壓壓的人羣四方八面地包圍着我，霸佔着我移動的空間，吞噬着我呼吸的空氣，我奮勇地衝，却闖不出血肉的藩籬，徒然加速自己的窒息。你們真像該死的螞蟻！我詛咒着；ECO却加上一句：你太誇獎自己的同類了！

旺角戲院的廣告還是老樣子，從「兒童最宜觀看」的到「祇宜成人觀看」的都光顧過了。有點茫然不知所措，一輛巴士適巧在身旁停下。

在人叢的肢體間穿過，在狹得要命的門縫擠過，好不容易把三角錢遞到售票大人跟前。瞪了我一眼，我的面孔變了問號。「四毫！」唉，渡海時注定要做一個貝聾多式的聾耳。

到達維多利亞港的彼岸，趕緊鑽進那「文化沙漠的綠州」。腳上被踩了一下，原來是小孩子在玩捉迷藏，還好，總算給灰茫茫的「綠州」帶來點生氣！

「綠州」既然不能給我庇蔭，只好重回「比沙漢還沙漠的荒原」裡。廣場上儼影雙雙，心坎裡一絲惆悵。石碑前男的在高談闊論着從沒發生過的歷史，水池旁女的在流着「比死海更鹹」的眼淚，樹蔭下男的和女的陶醉在「小規模的永恒」裡——「靈魂與靈魂最短的距離，當層層互熔發光的標記……」。太陽比維斯康提拍的還要熱，我比「陌路人」裡的馬斯杜安尼還要個。

我在動物園中迷了路。巍峨的建築物重重圍繞着我，就像奇形怪狀的獸籠，裡面多少猛獸張牙舞爪地鬧着人吃人的玩意，多少白領在重演又重演着「金屋深」的悲劇，大機構制度的魔掌在緊扣着每一隻生物的咽喉。幼年時的我感到目不忍給，青年時的我感到不忍卒睹，中年以後的我將會被關到獸籠裡給下一代欣賞。

物質文明把我引進了百貨公司。制服服的小姐白了我一眼，繼續着那永遠打不完的「牙較」。我擺出行家的姿態，品評着一條高價領帶，於是賣生藕的小姐終於來了，甜言蜜語地硬要撮合我和那毫不合意的領帶底姻緣。我的心臟笑到幾乎停止運動，就像沒有餌的漁夫捕獲鱸魚的獵物一樣。

洪流般的人潮，開始從獸籠的出口湧現，我忽然感到毛骨悚然；濃厚的化粧美化不了僵冷的的面孔，畢挺的西服遮蓋不了意識的喪失，時髦的裝束隱藏不了精神死亡。長此下去，幹我們這行的可真要貶值，總不能自命為與死神搏鬥的勇

無名

票

投

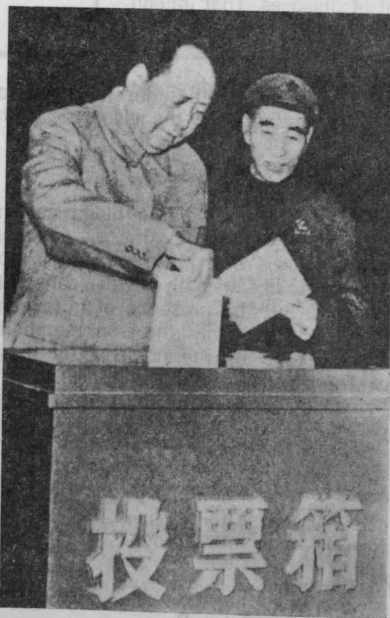
各位認為在這兩次投票選舉學學會會長時是否所有都是以個人的判斷來作出決定呢？

投票是一個團體或社會尊重其全體或部份成員都有獨立的意見而給與他們表示個人立場的機會。但很可惜，這個特權時常會用來作為派系取得勢力或聲望的工具。這樣就抹殺了投票原來的意義。

至於這兩次投票選舉會長可能有或沒有這種事情發生。去投票的都是大學生，可以算得上不是愚民，大家都能作出獨立的判斷，況且畢業後，社會上和工作上都時常需要我們以個人能力對事情下一決定，所以萬不能像木偶一樣被人拉着走，或衝動地認為團體的聲望是作為決定事情的一切因素。

如果你無條件地服從團體發出的指示，沉醉於建立派系的勢力，你會發覺當你必要地離開了某一個組織，一個派系解散了，你又會組織另一派系，以你的學識和資歷這些並不是困難的事情，但你可能發覺你一生也是在這些小圈子裡旋轉！

朋友們，大學生活是在乎培養獨立的思想 and 良好的人格，這樣我們才能正確和適當地運用日後在社會上所有的權力，所以千萬不要誤用現在大學中所給予你的機會向反方向而去！



Are they voting out of their own decision?

士，充其量只是修補行屍走肉機器匠，只是整個以物質權力為中心的大機構裡又一羣酒囊飯袋而已。

在小輪碼頭燈而窄的甬道裡，香水和尼古丁助着混濁的空氣施虐；也許仕女們塗在身上的都是瓊漿玉液，可是當不同牌子的香氣同時鑽進你的鼻孔，其感受正如同時讀着羅素、卡夫卡、沙岡，同時聽着米積加、拜雅斯、史特勞斯、不走火入魔才怪。此情此景，不知余光中還能來一首「香水的聯想」，張曉風作一篇「瘋子」，李敖寫一本「為香港人的思想趨向求答案」否？相信只有富於彈性的香港人才可以談笑自若；這邊廂仁兄們大談「金魚缸」走勢，那邊廂姐兒們大嫖。

同僚醜聞，難道這就是生活的樂趣？小輪在破浪前進，夕陽的餘霞燒燬了海風，報紙成了全船的主角，「美帝」、「蘇修」，「毛朝」、「蔣匪」、暴力、戰火、比比皆是，不然然想起查理士萊的「美國之綠化」；「這是一個時代的革命，它必須源自個人與文化，政治改革只是最終的一幕。它不須訴諸暴力，亦不能以暴力抵抗……」。

終於看到那親切的古銅色木門，一絲涼氣從門縫透了出來。重新倒進安樂椅的懷裡，拾起地上的小說，翻到第三頁。電鐘指着二時十九分，除了肺裡加添了的廢氣，過往的數個小時光景，就像是兩分鐘的神馳，從不會在塵世上勾留一樣。

香港大學學生會

醫學會月刊

第四卷

第十二期

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