



The specialists

專家之言

Three pioneers
in the field of
biotechnology
reveal some
innovative
medical advances

三位生物科技先驅揭示
醫藥研究的新突破

Chris Tsai, founder
of Bionet, says
biotechnology can
help in every stage
of a person's life

訊聯生物科技的創辦人
蔡政憲說，生物科技可
應用在人生的每個階段

IN THE BLOOD

TEXT/文 STEVEN CROOK

Chris Tsai's Bionet company uses stem-cell technology to treat a range of conditions including blood and immune-system disorders and cancers.

As founder and Chief Executive of Taiwan's first cord blood bank, Tsai has given families a chance to buy what he calls "family biological insurance". Among the services his company offers is the extraction and preservation of stem cells from the umbilical cords of newborn babies.

"Rather than compensate with money, we preserve the raw materials for the treatments and therapies that can restore a person's health," says Tsai, who has a PhD in chemical engineering from the University of Minnesota in the United States.

Stem cells – from cord blood, cord tissue, dental pulp or, controversially, embryos – are having a revolutionary impact on medicine. "Ten years ago I couldn't imagine that stem cells, gene therapy, genetic testing and gene modification could be so widely applied – to treat strokes, for cosmetic purposes, for hair growth and wound healing," says Tsai, who in 2009 won a Benchmark Entrepreneur award from Ernst & Young. "Biotechnology can help in every stage of your life, from prenatal to your very last day."

Since it was founded in August 1999, Bionet has served more than 200,000 clients in Taiwan. About 60 units of stem cells have been retrieved so they could be used to treat the infants from which they came, close relatives or – in at least one case – a complete stranger.

Explaining what led to him founding a biotechnology company, Tsai says: "When I was in college, one of my hobbies was analysing technological and scientific trends."

Tsai likens his work to monitoring a tsunami as it forms in the middle of an ocean "and then trying to predict where the waves will hit". Switching analogy, he says: "You have to jump on your surfboard just before the wave hits. If you do it too early, you just sit there. Too late and you miss the crest of the wave."

Bionet now offers a prenatal test for Down's syndrome that uses the mother's blood. It is more accurate and less risky than amniocentesis, a procedure that removes fluid from the womb to check for abnormalities in a baby.

"We were the very first company in the world to introduce prenatal genetic testing for spinal muscular atrophy," he says. "Until recently muscular dystrophy was considered untreatable, but therapy using cord-tissue stem cells has shown promise."

Tsai believes that, between them, cord blood, cord tissue and dental-pulp stem cells can deliver all the applications expected of embryonic stem cells.



A lab technician dispenses cord blood into test tubes at Bionet's laboratories (top); Tsai accepts his Ernst & Young Benchmark Entrepreneur of the Year award (above)

訊聯生物科技的實驗室技術員把臍帶血注入不同的試管內(最上圖); 蔡政憲喜獲安永會計事務所頒發的「安永創業家大獎」(上圖)

一脈相承

蔡政憲的訊聯生物科技公司利用幹細胞科技治療多種疾病, 包括血液及免疫系統疾病與癌症。

蔡政憲是台灣首個臍帶血庫的創辦人兼董事長, 其公司提供的服務包括萃取與儲存新生嬰兒的臍帶幹細胞。他稱這些服務讓廣大家庭可以購買「家庭生物醫療保險」。

蔡政憲在美國明尼蘇達大學取得化工與材料學博士學位, 他說:「與其以金錢作為保險賠償, 我們為人們保存治療所需的原材料, 讓他們重拾健康。」

取自臍帶血、臍帶組織、胚胎及牙髓的幹細胞, 在醫學上帶來革命性的影響。於2009年贏得安永會計事務所頒發「安永創業家大獎」的蔡政憲說:「十年前, 我無法想像幹細胞、基因療法、基因測試及基因改造會廣泛應用於治療中風、美容、生髮及傷口癒合上。由胎兒期到生命盡頭的不同階段, 生物科技都能幫上忙。」

自從於1999年8月成立以來, 訊聯在台灣服務逾20萬名客戶。約60個單位幹細胞曾從細胞庫中取用, 除了用以治療被提取幹細胞的幼兒或其近親外, 至少有一宗個案, 是用於治療與被提取者素不相識的陌生人。

他解釋成立生物科技公司的原因時說:「讀大學時, 我的嗜好是分析科技及科學潮流。」

蔡政憲將其工作比喻為觀察海嘯在海洋中形成, 並「嘗試估計海浪將衝擊的目標」。他又打了另一個比喻說:「你必須在浪濤來襲前一刻跳上滑浪板; 太早, 你只能呆等; 太晚, 又會錯失乘浪而去的良機。」

訊聯現在可以利用母親的血液, 進行唐氏綜合症的產前基因檢測。此方法比在子宮抽取羊水來檢查嬰兒是否正常的羊膜穿刺術更為準確, 而且風險較低。

他說:「我們是全球率先推出脊髓性肌肉萎縮症產前基因檢測的公司。肌肉萎縮向來被視為不治之症, 但採用臍帶組織幹細胞的療法已顯現不錯的成效。」

他相信在眾多幹細胞的來源當中, 臍帶血、臍帶組織及牙髓幹細胞在醫療運用上, 均可媲美胚胎幹細胞。

GLOBAL VISION

TEXT/文 SHOBA NARAYAN

Kiran Mazumdar-Shaw is the founder of Biocon, a global biopharmaceutical company conducting clinical trials to develop the world's first oral insulin.

It was almost by accident that Kiran Mazumdar-Shaw became a biotech entrepreneur. A trained brewmaster, she was unable to get a job when she returned to her hometown of Bengaluru after studying in Australia. She founded Biocon in her garage in 1978, initially to extract enzymes from papaya – which can be used to treat a range of ailments – for export to the United States and Europe.

Since then Biocon has evolved to produce a range of anti-diabetic, cardiovascular, autoimmune and other drugs. “With the world grappling with the healthcare crisis, every company in the pharma sector has had to chart out their own path,” she says. “Emerging markets are suddenly a big focus because big pharmaceutical companies can outsource their research to India and China.”

Biocon is engaged in cutting-edge research into therapeutic cancer vaccines and monoclonal antibodies to treat psoriasis and rheumatoid arthritis. The company is undertaking phase-three human clinical trials to develop the world's first oral insulin. “Diabetes is a global pandemic growing at an alarming rate with India as its epicentre,” says Shaw. “Everyone agrees that early insulinisation is a good way to combat diabetes.” Shaw says Biocon hopes to put the oral insulin drug on the market next year.

Traditional global pharmaceutical companies are facing many hurdles in the current market environment: declining research and development pipelines; a stagnating topline; regulatory challenges; and risks and costs associated with drug development. “The whole industry is recalibrating its strategy,” says Shaw. “Big pharmaceuticals have had to diversify their portfolios and go into vaccines, generics and bio similar drugs.” As one of the world's largest producers of generic drugs, India has had a head start in this area. “It is an interesting opportunity for companies in India,” she says.

Shaw is optimistic about the pharmaceutical industry's role amid this changing landscape, saying it is “all-pervading and all-inclusive and affecting every strata of society”. New frontiers include biofuels, genetically modified foods and green technology. “So far we have done untold damage to the environment, albeit unknowingly,” says Shaw. “Now it is time to take corrective measures.” And biotechnology will play a big part.



Equipment in a sterilisation process at Biocon (above)

Biocon生物科技製藥公司的儀器正在進行消毒程序(上圖)

全球視野

Kiran Mazumdar-Shaw是Biocon的創辦人，這間國際生物製藥公司現正進行全球首個口服胰島素的臨床試驗。

Shaw原是受過專業訓練的釀酒專家，卻在無心插柳下成為生物科技企業家。當年她從澳洲學成回國，在家鄉班加羅爾求職時四處碰壁。於1978年，她在家中的車房創辦了Biocon，最初主要是提煉可以治療多種疾病的木瓜酶，並出口至歐美。

其後，Biocon陸續推出了多款抗糖尿病、心血管病、自體免疫疾病等藥品。她說：「全球醫療系統陷入危機，每間藥廠均需研發更多樣化的產品。新興市場成為備受矚目的焦點，原因是大型的製藥公司可將研究工作外判給印度及中國的同業。」

Biocon進行的尖端研究包括癌症疫苗及單株抗體，後者可治療牛皮癬及類風濕性關節炎。該公司正為全球首個口服胰島素進行第三階段的人體臨床試驗。Shaw說：「糖尿病禍延全球，患者人數以驚人的速度增加，而印度更是重災區。業界普遍認同及早進行胰島素療法，能更有效對抗糖尿病。」她希望Biocon可在明年推出口服胰島素。

傳統的國際製藥公司在目前的市場環境中面對不少阻礙，當中包括：研發階段中的藥物數目下跌、利潤停滯不前、嚴苛的監管條例，以及研發藥物所涉及的風險及成本。Shaw解釋道：「整個產業正在重新調整營運策略。大型製藥廠必須擴展產品類型，推出疫苗、非專利藥品及生物仿製藥。」作為全球最大的非專利藥品生產國，印度在此領域擁有領先優勢。

她續說：「對印度公司來說，這是一個不容錯過的機遇。」

在瞬息萬變的環境下，她對製藥業在市場上所扮演的角色抱持樂觀態度。在她眼中，製藥業的影響力「無處不在、包羅萬有，影響著社會的各個層面。」全新的科技領域包括：生物燃料、基因改造食品及環保科技。她說：「在不知不覺的情況下，人類對環境已造成無法形容的破壞，是時候該作出補救。」而生物科技將擔當重要角色。

Clinigene (below) is a Biocon company that undertakes clinical research

Biocon旗下的Clinigene公司(下圖)專責臨床研究



Biocon boss Kiran Mazumdar-Shaw says new frontiers for pharmaceuticals lie in biofuels and green technology

Biocon老闆Kiran Mazumdar-Shaw認為，生物燃料和環保科技是製藥業需探索的新領域



Albert Yu Cheung-hoi,
Chairman of Hai Kang
Life Corporation, says
Hong Kong could be at
the forefront of global
biotechnology

海康生命科技有限公司
主席于常海認為香港可
成為全球生物科技的先鋒



ACCURATE DIAGNOSIS

TEXT/文 DICK CHAN

Professor Albert Yu Cheung-hoi has been at the forefront of battles against avian flu, SARS and the H1N1 influenza outbreak.

Albert Yu has devoted more than two decades to neuroscience and infectious-diseases research and today is Chairman and Chief Executive of Hai Kang Life Corporation Limited (HKLife), a leading Hong Kong-based biotechnology company, which was the first in Asia to carry out DNA-based food testing.

Born in Hong Kong, Yu received his PhD in pharmacology from Canada's University of Saskatchewan in 1984, and taught and carried out research in Canada and the United States for many years. Confident in Hong Kong's potential to develop its biotechnology industry, he returned to the city in 1994.

"I returned from the States at a time when Hong Kong was already an established international commercial and finance centre," says Yu, who is also Vice-Director of the Neuroscience Research Institute at Peking University and a professor of its Infectious Disease Centre. "Hong Kong led the way in Asia for its protection of intellectual properties, logistics and transportation infrastructure, nurturing of talent, international exchange, legal system, human resources and business environment. It works well as a catalyst in the development of the vast biotechnology market in China, and is equipped to compete in the industry internationally."

When Hong Kong was hit by the avian influenza outbreak in 1997, Yu noticed the medical sector lacked contingency measures for such infectious diseases, especially in the area of diagnostics. He focused on developing technology that would shorten diagnosis time and increase accuracy.

Yu is both an academic and bio-entrepreneur. "It's impractical for any technology to be limited to academic research and not be put to daily use," he says.

With more countries concentrating on biotechnology development, competition has created new challenges for Hong Kong. Yu says that since there is a lack of venture capital in the biotechnology industry in Hong Kong and Southeast Asia, government support is vital. "This could turn Hong Kong into a global pioneer in biotechnology," he says.

He is optimistic about the industry's future. "With more funding and favourable policies from the government, Hong Kong and Shenzhen can join forces in the development of biotechnology as a regional industry cluster. More professionals will join the industry and we can gain global recognition."

準確判斷

在對抗禽流感、沙士和H1N1甲型流感等傳染病爆發時，于常海教授都站在最前線。

于常海教授20多年來一直從事神經科學和感染病的研究，現時更是全亞洲首間以基因檢測方法來檢驗食品的海康生命科技有限公司的主席及行政總裁。

生於香港的于常海於1984年在加拿大Saskatchewan大學取得藥理學博士學位，曾在加拿大及美國從事研究及教學多年，他看好香港具備發展生物科技的潛力，在1994年回流香港。

現為北京大學醫學部神經科學研究所副所長及北京大學感染病研究中心教授的于常海表示：「我從美國回流時，香港已是國際知名的商業及金融中心，在保護知識產權、物流運輸建設、專業人材培訓、國際交流、司法制度、人力資源和營商環境等，在亞洲區內可說數一數二，具備加速國內龐大生物科技市場發展及與國際競賽的條件。」

香港於1997年爆發禽流感，他覺察到醫學界缺乏應變措施處理這類傳染病，特別是在診斷技術方面，所以便著手發展相關科技，目標是能加快診斷傳染病的速度及準確度。

于教授除了從事學術研究，更勇於冒險創業。他解釋：「所有的科技如果只限於學術研究，而不能應用於生活之上，都是不實際的。」

生物科技的發展愈來愈備受各國重視，同業之間的激烈競爭，令香港的生物科技發展面對嚴峻的挑戰。于常海指出，由於香港和東南亞地區缺乏投資基金支持發展生物科技，因此必須爭取政府的支持。他說：「政府的支持，對我們面對種種挑戰非常重要，能造就香港成為全球生物科技先鋒。」

面對生物科技的將來，他樂觀地表示：「如果得到更多的資金及政策支持，香港與深圳兩地在未來就可聯手將生物科技發展成地區工業，愈來愈多人會加入這個市場，而我們在國際也會佔取重要的地位。」



Cryogenic tubes used for deep freezing cells

凍存管用以儲存低溫冷凍的細胞

Eggs are often used as natural incubators (below); DNA on slides (bottom)

雞蛋常被用作培植疫苗的天然培養器（下圖）；載片上的基因樣本（最下圖）

