The Dirt Vaccine

Programme Transcript

10.00.00.	THE EDGE title	
10.00.20.	Fade out of white Toy bears are going around and around. Cu of boys face. Ambulance siren beep of machines. Child in hospital bed. Monitor: heart and breathing *Pilot Productions* *African child on dirt road. Looks straight to the camera.* John Stanford collecting mud samples. Pan on mud. John Stanford in lab talks to colleague and walks to lab bench. CU on jar.	Voice over 10.00.35. **Shortness of breath, wheezing, and in the worst cases, even death…** 10.00.43. **Asthma…** 10.00.45. **In Britain alone it affects one and half million children…** 10.00.49. **Yet the disease was hardly known a century ago, and troubles just the rich nations-it's still rare in the developing world.** 10.01.00. **Just why remains a mystery- as illusive as a cure. But British scientist John Stanford believes that in the African soil lies an answer- not only for asthma but for a host of other diseases as well.** 10.01.13. **John Stanford has found a micro-organism - that seems to unlock the incredible powers of the body's ability to fight illness. If he's right, it's a bacteria that will change medicine.**
10.01.25.		I/v.: John Stanford 10.01.25. **-'This organism corrects the immune system in a beneficial way and we are hoping that from it we can produce an agent which is going to be a value in a whole range of chronic diseases.'**
10.01.34.	*Fade out of black* Sparkle on drop of vaccine Doctor with vaccine Needle against white background.	Caption: 10.01.40. **THE** **DIRT** **VACCINE**
10.01.44.	*Béla Lovas*	V/o.: 10.01.48.

	Dividing bacteria	**Germs have a bad reputation…**
10.01.51.	*Film Images* *Health advisory film clip*	Health advisory film voice over 10.01.51. **'When handling food avoid coughing on it or sneezing on it.'**
10.01.56.	*Béla Lovas* *Dividing bacteria*	V/o.: 10.01.56. **For centuries we have been taught to think of them as the cause of disease…**
10.02.00.	*Film Images* *Health advisory film clip*	Health advisory film voice over 10.02.00. **'And don't, repeat don't ever do this sort of thing…Use your mouth and breath for singing or whistling or playing a mouth organ but never, repeat never for blowing into a paper bag into which food will be put.'**
10.02.12.	Shopping scene Picking up Domestos Mother from baby's point of view, Baby. *Cells Alive* *Pseudomonas auriginosa* *T4 phage bursting bacteria*	V/o.: 10.02.14. **Modern culture tends to equate all germs with devastating disease…but in fact the vast majority of micro-organisms are harmless to us, and some are absolutely essential for our well-being.** 10.02.30. **Our obsession with destroying bugs may have gone too far…**
10.02.33.	John Stanford walks behind tall grass Graham Rook in urban jungle turns towards camera	V/o.: 10.02.37. **Professor John Stanford and immunologist Graham Rook are among a growing number of scientists who believe that too little contact with bacteria maybe bad for our health…And it may actually cause disease…**
10.02.49.	Series of X-rays	Breathing space
		I/v.: Graham Rook: 10.02.51. **-'It is entirely possible that the increasing incidence of disorders like allergies and autoimmune diseases are due to man's isolation from bacteria in the environment.'**

10.03.00.	Modern buildings	Breathing space
10.03.03.	*Béla Lovas* *Bacteria*	I/v.: John Stanford: 10.03.03. **-'Just like the brain, the immune system needs to learn and part of the learning process is that the immune system goes through is that it meets with germs, bacteria.'**
10.03.12.	Little boy shooting	Breathing space
10.03.28.		I/v.: Graham Rook: 10.03.28. **-'If the immune system doesn't get this educational input, doesn't get properly trained it starts looking for fight, gets out of control.'**
10.03.27.	Action continues	Breathing space
10.03.28.	Boy tries to shoot flowers	I/v.: John Stanford: 10.03.28. **-'If you haven't meet sufficiently enough germs in the early development phases of your immune system, than you over react when you meet allergens and the result of this is allergic diseases.'**
10.03.38.	Aims again. Big sneeze.	Breathing space
10.03.42.	*Béla Lovas* *Microorganisms.* *Pilot Productions* *Travelling shots in Uganda* *Stanford's library* *Stanford in Nepal, 1984.* *Still photos*	V/o.: 10.03.44. **The idea that contact with bacteria is essential to our health is a theory that recently gained general acceptance in the scientific world. But for 30 years it's been everyday observation for Stanford.** **He studied man's relationship with bacteria at the front-line of medicine, travelling the developing world dealing with diseases of the poor like leprosy and tuberculosis.** 10.04.11. **With him he usually took his entire family, including his wife and collaborator, Cynthia.** 10.04.18. **They travelled where few would venture…Uganda, Latin America,**

		Nepal - even to a leprosarium in war-ravaged Iran…
10.04.27.	*Stanford's library* *Still photos*	I/v.: Cynthia Stanford 10.04.27. **-'We rolled up as a family, the children helped; you know even a 10 years olds can weigh and measure. And I think also because we weren't the perfect family because Matthew was retarded, because Mark had his problems as well, because we had an adopted child amongst us…and I think if it's John go just by himself he wouldn't be welcome at all he would have been seen as using people.'**
10.04.49.	*Stanford's library* *Bacteria chasing in Nepal* *Pilot Productions* *Uganda*	V/o: 10.04.52. **With his background in bacteriology Stanford was the right man in the right place to make a crucial observation…that an otherwise innocuous bacteria, - called M.vaccae, might make a dramatic contribution to treating an extraordinary range of diseases.** 10.05.10. **From a mud puddle in Africa he began a scientific odyssey around the world that is about to reach its climax…**
10.05.17.	*Pilot Productions* *Travelling shots in Uganda* Caption: 10.05.20 **Graham Rook** **Immunologist**	I/v.: Graham Rook: 10.05.17. **-'The story behind M.vaccae is some lovely detective work by my colleague John Stanford. Because he noticed that the incidence of leprosy and of TB, - the two major diseases caused by the pathogenic bacteria – the incidence of these diseases were different in different parts of the same country and it appeared to correlate with the geography of the countryside in which where they were living.'**
10.05.45.	*Pilot Productions* *Travelling shots in Uganda*	I/v.: John Stanford 10.05.47. **-'The whole concept of the importance of the contact between man and the environment**

		struck me first when I was working out with my family in Uganda. We were particularly interested in the distribution of TB and leprosy and why BCG has been so successful there in the prevention of leprosy.'
10.06.06.	*Stanford's library* *Marks of BCG vaccination* *Pilot Productions* *Travelling shots in Uganda* Map of Uganda, Lake Kyoga	V/o.: 10.06.06. **It has been known for some time that BCG, the vaccine usually used to prevent tuberculosis, was sometimes also effective against leprosy.** **Many trials were conducted in the 1970s to test its effectiveness, and for some unknown reason the best results were found in one isolated region of Uganda, - Lake Kyoga.**
10.06.29.	Stanford collecting soil samples (Recreation.)	I/v.: John Stanford 10.06.29. **-'We were particularly keen to find out since the effect of the vaccine was not world wide and that BCG doesn't work everywhere it only works in particular areas as well as it did in Uganda. And we wanted to know what was it that was so special in the environment that allowed it to happen. And it was from the bacteriological studies of the soil samples that we identified a whole series of different mycobacteria, most of them nothing apparently to do with disease. And amongst them there was an organism, - called M.vaccae.'**
10.06.59.	*Cells Alive* *White blood cells attacking bacteria*	I/v.: Graham Rook 10.06.59. **-'Of course it turned out to be an organism which shares many of its proteins with these pathogenic organisms, leprosy and TB.'** **-'The immune system sees the proteins of M.vaccae as though they would be in fact the proteins of leprosy and TB.The proteins are extremely similar**

		in the to groups of organisms.'
10.07.19.	Map detail *Stanford's libray:* *Women washing clothes in lake*	V/o.: 10.07.21. **Though very similar, one bacteria can kill, while the other can prevent disease.** 10.07.28. **And the richest source of helpful mycobacteria was along the shores Lake Kyoga, where people came to bathe and cook every day.**
10.07.37.	Caption:10.07.39. **John Stanford Microbiologist**	I/v.: John Stanford 10.07.37. **-'And when we put this together this with the distribution of TB, leprosy and the efficacy of BCG vaccine we realized that what determines man's susceptibility to disease or ability to respond to a vaccine is in fact the environment, what it meets in that environment.'**
10.07.52.	*Mostra River.*	Breathing space
10.07.56.	Stanford in UCL lab Stanford brings in a yellow plastic bag and hands it over to Graham McIntyre. *Stanford's library* *Mice experiment* Dissolve mice into UCL lab shots	V/o.: 10.07.56. **It was a radical theory at the time. And to test it, Stanford conducted an experiment back in London at the Middlesex Hospital…** 10.08.10. **M. vaccae was cultured from the Ugandan mud samples and added to the BCG vaccine.** 10.08.1. **The tests indicated that the animals given M.vaccae with their BCG were much better protected against leprosy than the ones that only received BCG.** 10.08.25. **It was an important first step that others would later confirm in more detail.** **M.vaccae seemed to be doing something highly beneficial to the immune system.**
10.08.36.		I/v.: Graham Rook: 10.08.36. **-'It is now generally accepted that organisms that are related**

		to leprosy and related to TB like M.vaccae from the environment can actually vaccinate people spontaneously. So people living in the appropriate environment and meeting with these organisms are protected to some extent to these diseases anyway.'
10.08.55.	Camr: M.vaccae harvesting sequence Showing workers in their strange clothes. Hi-tech vaccine production… Stanford in corridor Dolly shot of corridor in Royal Marsden, looking into wards, patients. Dolly shot. Pan on lab bench. Ends on orange M.vaccae in bottle. *Stanford's library* *Leprosy patient* John and Cynthia walks in the garden.	V/o.: 10.08.58. **Stanford's vision that the health of our immune system depends on our daily contact with environmental microbes had taken a crucial step forward once he tested M.vaccae in the lab.** 10.09.12. **But after years of seeing first hand the suffering of so many people from disease, Professor's Stanford's true aim was to see if he could put his research to medical use.** **M.vaccae had never been known to cause any disease and he decided to try it first in the prevention of mankind's most stigmatised illness, -leprosy…** 10.09.33. **But to be sure it was safe and had no side effects, he had to test it first on humans—and that meant injecting the bacteria into himself and his wife, Cynthia.**
10.09.44.		I/v.: Cynthia Stanford 10.09.44. **-'John and I injected each other to begin with. Because on the principal that you can't give to someone else if you are not prepared to have it yourself.'**
10.09.52.	UCL lab M.vaccae in tray, injection	*I/v.: Stanford's voice track* 10.09.53. ***-'The first one that had was back in 1975 and I've had them on and off ever since. When I used to make the material before, than every batch I used to test myself. Because I never wanted to give people you know an injection, which would***

		produce severe response.'
10.10.14.	*PilotProductions* *Bird flying.Mountains. Travelling shots, faces, Iranian girls.*	V/o.: 10.10.18. **In July 1978 the whole family went to Iran to evaluate the use of M.vaccae in the prevention of illness in the children of leprosy patients.** **They lived in Baba Bhari, - a leper colony near Tabriz.** 10.10.34. **Leprosy can lie dormant for many years and it would take a decade to see if the trial has succeeded.**
10.10.40.	Caption: 10.10.43. **Cynthia Stanford**	I/v.: Cynthia Stanford 10.10.42. **-'When we went back to Baba Bhari – at the height of the Iran-Iraq war, when we had an invitation to go back there – and all the children that we've vaccinated 12 years before, they were straight, they were tall, they were beautiful and there was not hint of leprosy or a case of TB in all that time. And than I knew it really really worked.'**
10.11.03.	Hot air balloon	Breathing space
10.11.09.	*PilotProductions* *Iranian children looking into the camera continuing shoots* *Travelling shots*	V/o.: 11.14. **Now that M.vaccae had shown itself to be successful in the prevention of leprosy the next step was to see if it could help those who already had the disease.** **And that took Stanford and his family to a leprosy hospital in Fontilles, Spain…**
10.11.28.	Cynthia and John in Fontilles	
10.11.38.	Starts with pan from bottles to Stanford	I/v.: John Stanford 10.11.38. **-'It was from this laboratory in Fontilles that so me of the early and very important work was carried out on Mycobacterium vaccae. At that time we were**

		moving in concept from prophylactic or preventing into therapeutic or treatment.'
10.11.52.	Long shot of mountains, wall. Pan from terraces or trees to hospital The wall. Pedro Torres and john Stanford in hospital corridor. They are seeing different leprosy patients.	V/o.: 10.11.54. **Like so many leper colonies, Fontilles suffered from people's unfounded fear of the disease. It was separated from the outside world by a stonewall even though its patients presented little danger…** 10.12.07. **The infectious stage of leprosy can be cured with antibiotics but for the patient the problem continues… Their immune system keeps attacking the body long after the last leprosy bacilli has been defeated.** 10.12.23. **What started, as an infection has become an autoimmune disease.** 10.12.28. **Stanford and his Spanish colleague Pedro Torres, - were interested in seeing if M.vaccae could help.**
10.12.35.		I/v.: Stanford 10.12.35. **-'When we first came here we started off with a dose which was determined for preventing the disease…'**
10.12.41.	Caption: 10.12.42. **Pedro Torres microbiologist**	I/v.: Pedro Torres 10.12.41. **-'And continued to increase yearly…'**
10.12.44.		I/v.: John Stanford 10.12.44. **-'And than we went up 10 fold, 10 times higher concentration and we observed those patient for a year and we went up ten times more…'**
10.12.53.		I/v.: Pedro Torres 10.12.53. **-'Until we reached what we have thought was the optimal dose for treatment.'**

10.12.57.		I/v.: John Stanford 10.12.57. **-'And at this point we have got the breakthrough in what we were looking for in immunity and we knew that we defined at least the beginning of a therapeutic treatment.'**
10.13.06.	Stanford checking skin result on old man Patient smiling and talking Camr vaccine production *Mostra* *Spanish landscape*	V/o.: 10.13.07. **M.vaccae was able to overcome the massive imbalance in the leprosy patient's immune systems.** 10.13.15. **The Spanish experiment established that M.vaccae was not just a preventative like a vaccine —it showed clearly that it had great potential as a treatment for established disease.** 10.13.26. **If Stanford was right, his discovery could make it's presence felt in other diseases too.**
10.13.33.	*Mostra* *Spanish landscape, moon*	Breathing space
10.13.38.	Caption:10.13.43. **John Stanford Microbiologist**	I/v.: John Stanford 10.13.38. **-'One of the firsts of these to turn up was observed by one of my colleagues Dr. Ramou in Southern India who found that amongst leprosy patients that he was treating with M.vaccae, there was one with coincident of psoriasis. And he went on to take a group of 9 or 10 cases of psoriasis without leprosy and showed that the immuno therapy was also effective in them. And once this has been picked up although we were saying there must be other diseases that it will effect, this was the first one that was clearly recognized.'**
10.14.09.	*Stanford's library:* *Family video.*	V/o 10.14.10. **In fact Cynthia Stanford who had a vascular disease may have been**

		the first to benefit from the vaccine.
10.14.16.	*Stanford's library:* *Family video.*	I/v.: Cynthia Stanford 10.14.16. **-'I had it and after the little pink bump gone down I sort of forgot about it and didn't think about it again until we got through the winter and I suddenly realized that it was Christmas and the Renaud's disease that I had wasn't there any more. And this was unheard of because before that I'd quite often I couldn't find money in my purse, you know my fingers were so clumsy handling keys was difficult.'** **-'In our family lots of people who suffer from Renaud's disease you know, and so, now since the cure was at hand, you know they would line up to have it. One was my mother who had cancer, including second, spinal secondary. One was my sister, who had arthritis as well, one had asthma, and one had schizophrenia. Anyway they has all lined up for the injection for their R. disease. And then I noticed that the other things disappeared too. Mother's cancer regressed and her secondary disappeared. Thomasina's asthma disappeared for 3 months.**
10.15.21.	*Stanford's library:* *Photo of Thomasina* Caption: 10.15.24 **Thomasina Stanford**	I/v.: Thomasina Stanford 10.15.21. **-'I just don't need to take my inhaler as much. Before that any time I did any sort of physical activity, you know from a child running around the playground to an adult doing any physical work in the garden or anything like that I needed my inhaler a lot. But now I don't need it nearly so much, maybe 2 or 3 times a day as opposed to 15-14 times.'**
10.15.39.	*Stanford's library:* *Family video.*	V/o.: 10.15.42. **The family observations were intriguing but still required**

	Hospital scenes: Royal Marsden, Southampton General Hospital X-ray.	**scientific investigation.** 10.15.48. **What is clear though that right now, we need a breakthrough. While medicine has made tremendous advances, in the new century we face a new challenge. Our sterile society has a health crisis.** 10.16.03. **New illnesses, allergic diseases in particular, are skyrocketing. Asthma alone afflicts between 20 and 30 per cent of people in countries like Britain and Australia. Autoimmune diseases like diabetes and multiple sclerosis are also on the rise.**
10.16.19.		I/v.: Graham Rook: 10.16.19. **-'Now the unifying thing about all 3 diseases that they are all disorders of the regulation of the immune system.'**
10.16.26.	*Mostra* *Images of air pollution, cars, traffic*	V/o.: 10.16.30. **What is changing in the environment of developed countries that is leading to an increase in these diseases? The evidence suggests a surprising cause.**
10.16.39.	*Film Images* *Children playing in street. Dirty little boys* Caption: 10.16.23. **Graham Rook Immunologist**	I/v.: Graham Rook: 10.16.42. **-'One of the first things to be noticed was that you are less likely to be allergic if you came from a large family with lots of siblings. It particularly helped if you have older brothers. They are better than older sisters, which is interesting because little brothers are probably dirtier.'**
10.16.58.	*Film Images* *Washing hands sequences*	V/o.: 10.16.59. **A study involving thousands of children showed that allergic reactions were influenced by how often the children washed their hands and faces. Those that washed less actually had better protection against allergic**

		disease.
10.17.14.	Children, and horses on farm.	I/v.: Graham Rook: 10.17.16. **-'Further work is being looked at into children brought up in farms and this seems to be true whether you are looking to Scandinavia, in Germany or in Switzerland. The children that are brought up on farms are less likely to have allergic symptoms than exactly equivalent children from the same economical background living in the same villages but not actually brought up on a farm.'** **-'All of these things therefore tend to suggest that organisms in the environment might actually be good for you. In terms of protecting you from allergy.'**
10.17.45.	Dust.	Breathing space
10.17.49.	Camr scientist looking into microscope and to microscopic image of M.vaccae	V/o.: 10.17.49. **It's a hypothesis that begins to solve the mysterious rise of allergic disease and …also points to an explanation as to why a harmless bacteria like M.vaccae could yield remarkable results.**
10.18.03.	*Film Images* *Little girl washing the floor, washing, little boy helping daddy.*	I/v.: John Stanford: 10.18.03. **-'Man evolved to live very close to his environment. In fact his immune system became dependent on that environment for one of its most important early lessons.'** **-'The lesson, which will result in our being able to overcome the problems of allergy and autoimmunity and other diseases for the rest of our long lives.'**
10.18.20.	Happy babies. Sneezing baby.	I/v.: Graham Rook: 10.18.21. **-'One problem is that we are born with a large repertoire of white blood cells which recognize not only foreign**

		proteins in bacteria and so forth but also our own proteins. Those cells now have got to be educated. You have got to have a mechanism that comes in and tells to those cells which can recognise you or the bacterium that they should attack when it is a bacterium and they should not attack when it is you.'
10.18.44.	*Film Images* *Baby in pram*	Breathing space
		I/v.: Graham Rook's voice track: 10.18.46. ***-'You are born with the hardware but you need a lot of software and information put in after birth for them to function correctly.'***
10.18.53.	*Film Images* *Father and son on the field*	V/o.: 10.18.54. **During the progress of Western civilization this vital contact with harmless bacteria is lost to many of us…**
10.19.02.	*Fast train shots cross cut with s*ilent almost still images of abandoned villages.	Breathing space
10.19.08.		V/o.: 10.19.08. **We moved from countryside to cities, lost contact with animals and especially the soil…**
10.19.15.	Pan on terraced landscape	I/v.: John Stanford: 10.19.16. **'You see this all too easily in looking here at the terraces. Terraces were made and one time there were thousands of people were working on them.** **Nearly everyone went out from the very earliest times into the fields and they lived in houses with earth floors, today all of that changed.'**
10.19.31.	Still pictures of abandoned village houses	Breathing space

		I/v.: John Stanford 10.19.34. **-'At first people thought that the more we were separated from germs the better it was for us. But now we began to realize that this is not right.'**
10.19.42.	*Béla Lovas* *Microorganisms.*	
10.19.43.		I/v.: John Stanford 10.19.43. **-'Any stone you pick up will have bacteria living underneath; any bit of dust will have bacteria living in it. And amongst these bacteria there are a group called mycobacteria and these are particularly important because they contain in their surrounding in their cell wall that wraps around them substances that drive the immune system in very important ways.'**
10.20.04.	*Cells Alive* *White blood cell and bacteria with capsule.*	I/v.: Graham Rook 10.20.04. **-'We think that they maybe the ones because they were there throughout the mammalian evolution are now an actual necessity to the immune system. The immune system expects them to be there, as it evolved with them there but they are not there in a concrete environment or in treated water, chlorinated water that we now all drink.'**
10.20.22.	*Mostra* *Water. Treating water.*	Breathing space.
10.20.23.		I/v.: Graham Rook 10.20.23. **-'What we do need to do is to find out what we have lost through modern hygiene and put it back.'**
10.20.30.	Camr. Blue fog of nitrogen	Breathing space.
10.20.35.	Camr. Blue fog of	I/v.: Graham Rook 10.20.35. **-'Contaminating the environment**

	nitrogen, taking out seed samples from liquid nitrogen. Vaccinating people.	**with organisms deliberately which are protective is certainly an option. Why shouldn't we spray them into the environment? Why shouldn't we spray them into house dust? There are many possibilities. We may also want to make new vaccines. Vaccines which actually replace that learning input that is no longer present in the environment.'**
10.20.53.	Stanford running down on staircase, Rook leaving building Product finish at Camr. Southampton hospital. Dr. Djukanovic walking in corridor.	V/o.: 10.20.55. **Which is exactly what Stanford and Rook are doing. With the backing of the University College of London they have formed a public company to develop new treatments based on M.vaccae.** **It is an expensive and complex process that involves working with many other independent scientists in clinical trials.** 10.21.17. **The vaccine for the trials contain harmless M. vaccae from the original African mud cultured in Britain in the specialist laboratories at Camr, Porton Down.** **It can then be used in closely controlled human trials…** **Among them, those of asthma specialist; Dr. Ratko Djukanovic at Southampton General Hospital. He is looking for a way to stabilize the over-reacting immune system of his asthma patients.**
10.21.46.	Caption: 10.21.49. **Dr Ratko Djukanovic Asthma specialist**	I/v.:Dr. Ratko Djukanovic 10.21.46. **-'Those of us who are interested in allergic disease such as asthma for a long time have been looking for a magic bullet which would give us the possibility to readdress the balance…'**
10.21.59.	*Film Images Sea-saw*	Breathing space.
10.22.03.	Dr. Djukanovic goes to see a	V/o.: 10.22.03.

	volunteer	**The apparent ability of M.vaccae to act as a switch on the immune system convinced Djukanovic to put M.vaccae to the test.**
10.22.10.		Short piece with Dr.Djukanovic and Leanne 10.22.10. **R.D.: -'Hello! I am Dr. Djukanovic.'** **Leanne: -'Hello!'** **R.D.: -'Nice to meet you…What we try to see is the effect of a vaccine that has been found to have an important regulatory effect on the immune system.'**
10.22.23.	Leanne's breathing test Vaccinating Christine Allergen challenge with Mark	V/o.: 10.22.23. **The results of the small trial were very encouraging.** **After only one injection of M.vaccae, asthma symptoms were reduced on average by 30 per cent, and in two thirds of the patients by even more.** 10.22.37. **Mark Dyer was one of them…**
10.22.39.	Mark's allergen challenge with house mite dust	I/v.: Mark Dyer 10.22.43. **-'I don't have to think anymore of where is my medication where is my Ventollin. I used to it take with me everywhere where I went.'** **-'There is never any more nagging doubts in the back of mind, where have I got enough Ventollin with me? Am I going to suffer from asthma attack today?'**
10.22.58.	Sequence continues	I/v.: Dr Ratko Djukanovic 10.22.58. **-'Although it is early days, the results are very exciting.** **-'What we have now is a proof of concept what we have to take further.'**
10.23.09.	Royal Marsden Hospital	V/o.: 10.23.12. **M.vaccae has shown itself to be effective in dealing with entirely different diseases like leprosy and asthma…. but its**

	Science papers	**powers may not stop there.** 10.23.21. **It may have a role to play in beating the greatest medical challenge of them all - cancer.** 10.23.30. **In 1988 British Professor John Grange observed that the BCG vaccine was beneficial in treating the disease.** 10.23.39. **M.vaccae may do even better.**
10.23.42.	Caption: 10.23.43. **Graham Rook Immunologist**	I/v.: Graham Rook 10.23.42. **-'Curiously cancer patients immune system although don't develop allergies, never the less they have a shift in the balance in the immune system in rather the same direction as the shift that occurs in allergic people. So by M.vaccae helps to turning off that part of the system which is not good for dealing with cancer and switches on that part of the immune system which is good dealing with cancer. And than the immune system just does the job all by itself.'**
10.24.05.	Dr Mary O'Brien sees cancer patient in ward, general hospital shots in corridors and wards	V/o.: 10.24.07. **A number of cancer trials are on the way and Dr. Mary O'Brien at the Royal Marsden Hospital, London, leads one of them.**
10.24.16.	Mary look at X-rays and takes it off, leaves frame. Corridor, from front leaves frame	I/v.: Dr Mary O'Brien's voice track 10.24.16. **-'For decades doctors have tried to use the immune system as a treatment of cancer in a way trying to trigger the immune system to recognize that something that is foreign in their body, - ie. a cancer.** **-'Around the beginning of 1996 I was very impressed with the results that I saw in laboratory models of cancer using M.vaccae...At that point I tried to think how we could apply this to patients with cancer and in my own practice, patients with**

		lung cancer.'
10.24.50.	Administering M.vaccae	Interplay Dr Mary O'Brien and Dennis Morris: 10.24.50. **Dennis: -'Hello, doctor.'** **M.O'B: -'Good morning, Mr. Morris. What sort of night did you have?'** **Dennis: -'Not to bad.'** **M.O'B: -'Good. Are you ready to have this vaccine.'** **Dennis: -'-Yes, doctor.** **M.O'B: -'If you just lie down there. Right. I'll give it into the arm here under the skin.'**
10.25.00.	Vaccination	V/o.: 10.25.01. **Initially Dr O'Brien used M.vaccae in combination with chemotherapy in a small group of last stage lung cancer patients…**
10.25.09.	Vaccination Caption: 10.25.27. **Dr Mary O'Brien Oncologist**	I/v.: Dr Mary O'Brien: 10.25.09. **-'To our surprise we found that patients receiving M.vaccae plus chemotherapy did better than we expected. And even though that we began in 1996 we still have some survivals from that study and they were all treated with the combination. In medicine we than proceed to confirm our results because many things that we see in small pilot studies are actually due to selection of cases and a little bit of luck on the part of the patients and their investigators. To confirm that this is a real scientific observation we have to do a large study, a randomised study, what we call a Phase III study.'**
10.25.51.	Cancer patients in their wards	V/o.: 10.25.55. **This larger so-called Phase III trial has now studied 400 lung cancer patients from around Europe to test the effectiveness of combined M.vaccae and chemotherapy.**
		I/v.: Dr Mary O'Brien: 10.26.06.

		-'If the Phase III study is positive showing that the addition of M.vaccae to standard chemotherapy improves survival by a small amount but real which is statistically significant then I think we are on to something that we haven't have in medicine for a number of years.'
10.26.26.	Montage of the miles stones of the story	V/o. 10.26.30. **30 years after it began, John Stanford's scientific journey has reached its final stage. The promising clinical trials now need to be replicated widely, and then official approval lies ahead.**
10.26.42.		I/v.: John Stanford 10.26.44. **-'It looks incredible now to look back that the simple observations were made in a car coming through Uganda had played out so well. But in fact when you look back on it you can think as so many things that are really really that simple that had you just laid in the bath for long enough you would been able to turn this up without actually having to go anywhere.'**
10.27.07.	Cynthia and John in the garden of Sanatorio Fontilles	I/v.: Cynthia Stanford 10.27.07. **-'Once you had been working towards something for a very long time, when you arrive at it when one can see the full thing unfolding in front of you – it is lovely.'**
10.27.19.	Stanford greeting leprosy patient in Fontilles	I/v.: John Stanford 10.27.20. **-'It is the first time that something was taken from the environment and being used to modify the immune system in a way that will influence a whole lot of diseases.'**
10.27.31.	Camr, vaccine production	I/v.: Graham Rook 10.27.32. **-'At present we regard it as a**

	production	**potential treatment. That doesn't mean that in the future with increased knowledge of how to use it, improved regimens getting right exactly the optimum doses, frequencies, that maybe we can go beyond mere treatment but at the present we certainly can't say that.'**
10.27.50.		I/v.:Stanford 10.27.50. **-'At first of course it is going to be aimed at developed world diseases, perhaps cancer will be the first or perhaps allergies will be there but there is no doubt at all that as soon as we can it is very necessary that it is used for the developing world which is where it was born and what it was originally designed to do.'**
10.28.11.	*Pilot Productions* *People in Uganda and Iran*	Breathing space
10.28.15.	*Pilot Productions* *People in Uganda and Iran*	I/v.: Cynthia Stanford 10.28.15. **-'One of the side products of our research is the charity. We try to help the people that are disabled by both poverty and disease. I don't think it is right to make discoveries in the developing part of the world and then exploit them in the developed part of the world. One has to readdress the balance.'**

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