What Is Coming Through That Needle?
The Problem of Pathogenic Vaccine Contamination

Benjamin McRearden

In recent times mankind is experiencing a situation never previously encountered, that being the threat of release of pathogens intended to kill or disable large numbers of people. That danger has prompted certain health agencies to prepare for possible mass vaccination of the populace. The purpose of this report is to examine the existing scientific evidence of pathogenic contaminants in vaccines. This summary, while making no claim of being a complete review of the subject, will point out sufficient examples and illustrations of contamination with bacteria, viruses, and their components, so as to enable the reader to make a more informed decision regarding accepting a vaccination (or forcing others to receive one). It is presented in a format intended for the public, their physicians, and their agency or governmental representatives, and may be freely copied in its entirety.

If you as an individual are too busy to read this brief summary in one sitting, please be aware there is ample evidence in the scientific literature that serious viruses, bacteria; or components and toxins therefrom; as well as foreign animal or cancer-related proteins and DNA are finding their way into the commercial vaccines intended for humans, pets, and agricultural animals. If you are interested in the short and long-term health of yourself and those you care about, or serve as a public servant or medical advisor, you do owe it to yourself to be informed.

In the production of viral vaccines on a commercial scale, the virus of concern must be reproduced in large quantities. Viruses cannot survive or reproduce without being introduced into cells that nourish them, which enables the viral reproductive activity. In that sense all viruses can be considered parasitic on other cells. Living cell types commonly used to reproduce viruses in the lab include monkey kidney cells, chicken embryos, as well as other animal and human cells. These cells must also be nourished with food, and are most often fed with a nutrient mix containing in large part, bovine (cow) calf serum (usually, serum extracted from fetal calf blood). This product can carry many types of bovine blood-borne viruses, and is one of the primary sources of vaccine contaminants. A journal article states, "a potential risk associated with the production and use of biological products is viral contamination. This contamination may be present in the source material, e.g. human blood, human or animal tissues, cell banks, or introduced in the manufacturing process through the use of animal sera..."(1)

Bovine viruses

The viruses and other agents that can contaminate bovine calf serum are numerous. One of the most prominent is a pestivirus called bovine viral diarrhea virus (2). More specifically, we see in several scientific journal sources these types of statements: "contamination of a vaccine as a consequence of infection of fetal calf serum"(3); "many batches of commercially available serum are contaminated with viruses such as BVD" [bovine viral diarrhea] (4); "virus was isolated from 332 of 1,608 (20.6%) lots of raw fetal calf serum obtained specifically for the Center and 93 of 190 (49%) lots of commercially available fetal calf serum (5); "agents most frequently detected in CCL's [continuous cell lines] have been bovine viral diarrhea virus and mycoplasma. Our laboratory has consistently found that the source of bovine viral diarrhea contamination of CCLs has been the use of contaminated fetal bovine cell culture enrichment serum"(6); and finally, "In conclusion, **most commercially available bovine sera are contaminated with BVDV** and, although there is no evidence that the virus is infectious, bovine sera should be screened for this virus…for the development or production of vaccine."(7)

Can this virus cause infection or disease in humans? New evidence shows this is possible, as researchers have found a new strain that was isolated from human cells, and it is very closely related to the bovine strains (8). One study finds that an alarming 75% of all laboratory cell lines examined were contaminated with pestivirus strains; of these, **all** of the bovine cell lines were contaminated with one of three possible BVDV strains; cell lines from other animal sources including primates, sometimes contained one of these BVDV strains (9).

There is now heightened concern that this virus and others can cross species lines, creating new strains as they adapt to their new hosts, and this would include passage of the virus to and from humans. Whether the human strain of BVDV causes overt illness is uncertain, because physicians may be uninformed and not even be looking for this virus. It may be useful however, to compare the infection patterns in cattle. They can be persistently infected at a low level for their entire life with a non-pathogenic strain of the virus. Under these conditions, they consistently create and shed virus into the surrounding environment, which then infects other animals. The virus can nonetheless become lethal to the animal if it mutates, with the new form also causing "visible cell damage and death" in cultured conditions (10). The animal succumbs to gradual or acute deterioration of the gastrointestinal mucous lining, which produces diarrhea and its eventual demise. However, mutated virus is not *always* necessary to provoke debilitating illness and death, and ordinary virus can be isolated from the cow's pancreas, adrenal glands, and pituitary glands (11); the virus has also been documented as causing serious pulmonary illness (12). A study describes an outbreak of disease among goats due to a vaccine contaminated with a bovine pestivirus; oddly, these animals experienced reproductive failure and lesions to the central nervous system (13). So, can these disease symptoms in varied organs and tissues also occur in humans when they carry this virus short or long-term?

A cursory examination of the literature indicates this may be occurring. One revealing study tells us "faeces from children under 2 years old who had gastroenteritis that could not be attributed to recognised enteric pathogens were examined…for Pestivirus antigens. Such antigens were detected in 30 of 128 episodes of gastroenteritis…The diarrhoeal disease in children excreting Pestivirus antigens resembled that in other children except that it was more commonly associated with signs and symptoms of respiratory inflammation."(14) There are also concerns regarding a pattern of pestivirus infection in infacts born with microcephaly, a condition wherein the head or cranial capacity is unusually small (15, 16).

Scientists from the USDA National Veterinary Services Laboratory describe the situation quite clearly, and give an indication of the seriousness of the problem: "The high frequency of virus and antibody detection in individual animal or small pool samples suggests that any large pool of unscreened sera will be contaminated. Infection of cell cultures with BVDV can lead to interference with the growth of other viruses. **Vaccine produced on contaminated cells may in turn be contaminated, leading to seroconversion or disease in the vaccine.** The safety, purity, and efficacy of viral vaccines require BVDV testing of ingredients, cell substrates and final product."(17)
And here is a similar statement from a New York Blood Center: "Bovine viral diarrhea virus, whose small virion size does not allow 100% assurance of its removal by filtration, **may potentially contaminate every lot of commercially produced fetal bovine serum**."(18)

In reality though, how much of this particular viral contaminant has trickled into humans? Well, in spite of manufacturers and regulatory agencies claiming efficacy of their testing procedures, one 2001 study found 13% of human MMR, polio, or Streptococcus pneumoniae vaccines tested positive for pestivirus RNA (19). And another researcher observes, "serum antibodies against BVDV have been detected in approximately 30% of human population who had no contact with potentially infected animals."(16) Also, "pestiviruses adapted to human cell cultures may be harmful because serious BVDV infections in humans have been frequently suggested…The BVDV persistently infected in cell cultures used for vaccine productions have been shown to be a source of

contamination in live virus vaccines. It is, therefore, prerequisite to examine pestivirus contamination in cell cultures to avoid secondary infections in humans as well as in animals."(20)

Continuous immortal cell lines

This same scientist brings up another important issue. Because many medical-use biological products (including vaccines) are now being cultured or produced on what is called "continuous" cell lines (i.e., these are cell cultures consisting of "immortal" or cancerous types of cells because they have no limits on how many times they can divide), there is concern that viral contamination of these cell lines with a pathogen like bovine viral diarrhea virus, could spread cancer-promoting material into the human recipient. How could this happen? Briefly, it works like this. The virus (which in this case has a single strand of RNA for its genome) is capable of incorporating RNA from the cells in which it has been cultured, into its own genome. If any contaminant RNA virus is present in a culture that contains immortal cancerous cells, this virus can easily mutate to include unwanted oncogenic material, which can then get passed into the biological product intended for human medical use (16).

Were you aware that biological products, including some common vaccines (for instance, polio and rabies), are being produced on "continuous" immortal cell lines? Manufacturers, scientists, and agencies will often assure us that these cells themselves are not "tumorigenic", i.e., they do not cause tumors per se. A closer look however, shows this is not always the case. While lab culturing may indicate that these types of cells are not immediately changing to overt tumor cells, it is now well-known in the scientific community that after these cells have been repeatedly cultured a certain number of times, something causes them to convert to a cancerous state (21).

This journal article summary addresses the issue in regards to Vero cells, which is a continuous cell line coming from the African green monkey, and is commonly used in vaccine production. It states, "One of the current criteria for evaluating the acceptability of cell lines for use in vaccine production is lack of tumorigenicity. Vero cells represent an example of a class of cells known as continuous cell lines. They were derived from African green monkey kidney, and their growth properties and culture characteristics have many advantages over other cell substrates for use in vaccine production. We have tested Vero cells for tumorigenicity in nude mice and in a human muscle organ culture system, and found a significant increase in their tumorigenic potential with increasing passage numbers. Cells at passage 232 and higher produced nodules in all nude mice inoculated."(22) [The term "passage" in this context means the number of times a cell line has been cultured].

There is another very important issue reported in studies that is evidently being largely ignored as regards long-term vaccine effects and safety. There is obvious evidence that in the lab, continuous immortal cell lines react differently between one type of animal species and another (21, 23). As an example, tissue from one species will allow the immortal cell to induce a cancerous change more quickly, in comparison to tissue from a different species. These results then beg the following questions. How extensively have these continuous cell lines been tested on human tissues, and would the results vary from one *type* of tissue to another? And what happens over the long term…if an immortal cell from a vaccine culture makes its way into the final vaccine product, does it keep dividing in the human body? Another scenario might suggest the tumor-promoting portion of its DNA inserting into a viral genome, which then gets injected into the body…what happens at that point?

Furthermore, given the evidence that closely-related animal species (as an example, various species of monkeys) react differently to immortal cells, do we also need to consider that any one vaccine intended for all humans might ultimately react differently among the various races, ethnic groups, and sexes? And what are the effects of the vaccine contaminants on persons with immune depression, on the elderly, or on infants?

A letter from the FDA to vaccine manufacturers dated as recently as March 2001 shows that this issue regarding immortal cell lines is still of concern. It states, "In general, CBER [Center for Biologics Evaluation and Research] currently views Vero cells as an acceptable substrate for viral vaccines, but has residual concerns…CBER recommends that all products derived from Vero cells be free of residual intact Vero cells. If your manufacturing process does not include a validated filtration step or other validated procedure to clear residual intact Vero cells from the product, please incorporate such a procedure into your manufacturing process."(24) It is now 16 years after the WHO gave a go-ahead (in 1986) to use continuous cell lines for vaccine production (25), and yet there are **very basic** safety questions not resolved by the manufacturers, agencies, and scientific community, much less the finer details (26, 27). One 1991 study reports: "Cell substrate DNA was shown to be an abundant contaminant in the clarified preparations of the Sabin type 1, 2 and 3 poliovaccines produced on a continuous cell line"(28). Another indicates that immortal cell lines showed 100-times greater number of DNA recombination events compared to normal cells (29). As one researcher states, "Using neoplastic cell lines as substrates for vaccine development could inadvertently result in viral-viral or viral-cellular interactions whose biological consequences are unclear…viral-viral and viral-cellular interactions **can result in the generation of new retroviruses** with pathological consequences."(30). We note the term "neoplastic" means the quality of having an abnormal growth characteristic.

There is an even stronger statement dating back to 1990. A scientist in the field writes, "The present concern is for safety of vaccines made using transformed or neoplastic mammalian cells that may contain endogenous contaminating viruses or integrated gene sequences from oncogenic viruses. There is also concern for use of plasmid vectors employing promoter elements from oncogenic viruses. The principal concern for safety lies with retention of residual DNA in the vaccine, **especially since induction of cancer is a single-cell phenomenon, and a single functional unit of foreign DNA integrated into the host cell genome might serve to induce cell transformation** as a single event or part of a series of multifactorial events. Current proposed standards for vaccines would permit contamination with up to 100 pg [picograms] of heterologous DNA per dose. This is equivalent to about 10(8) 'functional lengths' of DNA. Total safety would seem to require complete absence of DNA from the product."(31)

Please note that 10(8) means 10 to the power of 8, or **100,000,000 "functional lengths" of DNA are allowed per dose of vaccine**. Is there something wrong with this picture? How long will the general public be subjected to these vaccine products that according to this information, are nowhere near safe?

It has taken, for instance, approximately forty years for the scientific community to finally acknowledge that we have a serious problem as a result of the contamination of polio vaccines with simian virus 40 (SV40) in the late 1950s-early 1960s. There has been previous evidence of some human brain and other tumors containing this virus (32, 33), but the medical community has been slow to acknowledge a definitive link between SV40 and cancer in humans. However, two independent research teams have recently found this virus present in 43% of cases of non-Hodgkins lymphoma (34, 35). Another study found it present in 36% of brain tumors, 16% of healthy blood cell samples, and 22% of healthy semen samples (36). And strangely, SV40 has now been found to infect children (37). Considering that children of this era, are not supposed to be receiving the virus via the vaccine contamination route, this would therefore imply that SV40 is being transmitted from one human to another, in ways not previously known.

Other simian viruses may also be contaminating the (Vero) monkey cell lines used for vaccine production. One example from the literature cites the contamination presence of SV20, which is a oncogenic simian adenovirus (38).

Simply put, are we in a state of denial that vaccines are ultimately transmitting viruses, DNA, and proteins into humans from foreign animal sources (and possibly unhealthy human sources), and that this may be strongly contributing to the incredible upsurge in cancers and serious chronic diseases? Are these foreign animal genes altering *your* DNA? Furthermore, given that viral presence can sometimes take years to manifest actual disease symptoms, and then considering the tendencies of health-related agencies and corporations towards **short**-term solutions and profits, will we ever truly know the **long**-term consequences until it is too late?

Other bovine viruses

Another contaminating virus found in the calf serum used for vaccine production is bovine polyomavirus (polyomaviruses are strongly associated with cancer); one pertinent article is titled "Bovine polyomavirus, a frequent contaminant of calf serum"(39). Other contaminants include a virus from the parvovirus family (40); another study cites "virus-like particles" and "mycoplasma-like agents" in 68% and 20% of the samples, respectively (41); and yet another mentions the presence of infectious bovine rhinotracheitis virus (aka bovine herpesvirus 1), and parainfluenza-3 virus in addition to the common BVDV (42). An interesting report from 1975 not only affirms the presence of these viruses in calf serum, and mentions the additional presence of bovine enterovirus-4, but also tells us that 25% of serum lots that were pre-tested by the suppliers and "considered to be free of known viral contaminants" were actually contaminated with bovine viruses (43). It should be obvious that any bovine blood-borne virus (including serious retroviruses such as bovine leukemia virus, bovine visna virus, and bovine immunodeficiency virus) could ultimately end up in human or animal vaccines via the use of calf serum in the manufacturing process.

Contamination of calf serum with certain bovine herpesviruses, and the possible implication for human health, deserves a bit of scrutiny. It is known that bovine herpesvirus-1 replicates easily in a human embryo cell line called WI-38 (44). It is also known that bovine herpesvirus-4 is quite "persistent" in calf serum, and has a wide host range, including human cells (45). In fact, this particular virus strongly replicates in two human embryonic cell lines, WI-38 and MRC-5, enough so to prompt one author to give these details and a warning: "PCR [polymerase chain reaction] detected a 10,000-times-higher level of BHV-4 [bovine herpesvirus-4] DNA… the supernatant indicated a 100-fold increase of infectious particles. Since this is the first bovine (human herpesvirus 8 and Epstein-Barr virus related) herpesvirus which replicates on human cells in vitro, the danger of possible human BHV-4 infection should not be ignored." (46)

The clincher to this possible contamination, is that these same human cell lines WI-38 and MRC-5 are two of the **most common human cell lines used to manufacture viral vaccines**, (for example - rubella, chickenpox, smallpox) and these cell lines are of course, commonly nurtured with calf serum.

Contaminants from chicken sources

Some viral vaccines are produced by growing the virus in chicken eggs. Common human vaccines manufactured by this method include influenza, mumps, measles, yellow fever, and others. Like the vaccines that include bovine-source materials, those derived from chicken embryo culture are plagued with some very serious viral contamination problems.

Avian leukosis virus (aka avian leukemia virus or ALV) is a retroviral pathogen that infects large segments of the modern poultry industry, is present in commercial chickens and eggs, and thus exposes humans on a consistent basis (47). An interesting virus in the sense that it can be considered a "parent", it easily transforms into a dizzying array of related viruses by hijacking one of numerous cancer-related gene segments from its host, and inserting it into its own genome. Furthermore, it has the additional capability of inserting itself into the host (including human) genome, hiding out so to

speak, and causing cancerous cell transformation from that location. There is now much scientific literature available that describes the various active mechanisms of this and other cancer-associated viruses (48). Viruses that originate from the "parent" avian leukosis virus, include the potent Rous sarcoma virus, Rous-associated viruses, avian myeloblastosis virus, avian myelocytoma virus, avian erythroblastosis virus, Fujinami sarcoma virus, etc. One group of researchers studying the mechanism of ALV writes, "Serial passaging of a retrovirus that does not carry an oncogene on such cultures **leads with a high frequency to the emergence of new viruses** that have transduced oncogenes…"(49). In other words, given the right growth conditions, ALV can easily transform into other closely related viruses that are known to be cancer-related.

Just how common is this avian leukosis virus in viral vaccines? The first evidence of contamination came to light in the 1960s when yellow fever vaccine was found to contain it (50). Since that time, it is common knowledge in the industry that this virus (or components thereof) still linger in human and animal vaccines (51). Indeed, the respected Fields Virology text (year 2001 edition) states, "At the present time, vaccines produced by some of the world's 12 manufacturing institutes are contaminated with avian leukosis virus"(52). One point that researchers in this field *do* agree upon, are the presence of ALV, avian endogenous virus, avian reticuloendotheliosis virus (another poultry retrovirus), and also an enzyme called reverse transcriptase (a component of retroviruses) in final vaccine products intended for human use, especially the mumps, measles, yellow fever, and influenza vaccines (53, 54, 55). What they do *not* agree upon are the effects on humans in terms of transmission, infection, and possible subsequent disease. A recent study coming out of the U.S. CDC (Centers for Disease Control), which analyzed frozen blood serum samples from children that had received MMR vaccinations, reports no avian viral presence in these samples (56).

And yet, we see reports from other researchers that make us question the results of that study. As is often the case with viruses, some strains will show particular affinities for certain types of tissues or growth conditions, and ALV is no exception (57). One researcher makes the effort to explain, "Because of the difficulty in infecting mammalian cells in vitro with these viruses, it is generally held that they do not infect humans…Our results show that exposed poultry workers **and subjects with no occupational exposure to these viruses** have antibodies in their sera specifically directed against ALSV [Avian leucosis/sarcoma viruses]… Further investigation into whether these findings mean that virus has been integrated into the human genome is needed, to assess the public health implications of these results."(58). He also explains in another article, that given the known behavior of these viruses in mammalian cellular culture, a blood serum test will not always provide the correct evidence of viral presence in the human body (47). In other words, does the virus (or viral antibodies) need to be actively present in the blood stream at the time of the blood draw? What if the viral particles have retreated into other tissues? Thus the CDC study mentioned above may not have presented an accurate assessment of viral presence, or long-term effects from the numerous ALV-associated "offspring" viruses. Considering that ALV can for example, easily capture the human "erbB" oncogene (59), and that erbB as well as the oncogene called myc are strongly associated with common forms of human breast cancer, it seems that the issue of ALV vaccine contamination would deserve a high level of attention! (By the way, the general reader should not feel intimidated by the abbreviations associated with oncogenes…erb refers to "erythroblastosis", and myc refers to myelocytomatosis, which are the names of two ALV-associated offspring viruses). A well-known microbiology text reinforces these concepts by teaching, "Proto-oncogenes become incorporated into retroviral genomes with surprising ease." (60)

Toxin contamination

The unintentional presence of bacterial-source toxins (called "endotoxins" or "exotoxins") in human and veterinary vaccines has been recognized for many years. Such toxins are originally present in source materials, or are produced as a result of bacterial infection during the manufacturing process (61, 62). The various methods used in attempts to eliminate viruses and bacteria from

vaccines are simply not effective in the removal of these problematic toxic proteins (63). Several observers have expressed concern that the presence of endotoxin may be a source of severe adverse reactions seen in some individuals after receiving a vaccine (61, 64). Some vaccines, such as those for diphtheria and tetanus, are specifically created to induce a protective mechanism in the body against the bacterial toxin; however, vaccines prepared from bacteria can contain appreciable and potentially dangerous lingering amounts of toxin, despite the steps used during manufacture to decrease the toxic potency, as described in this comment: "Vaccines composed of gram-negative bacteria contain endotoxin in considerable amounts. This may result in adverse effects after vaccination of sensitive animals." (65). It has also been reported that bacterial toxin contamination residing in calf serum, can cause breaks in the DNA of human cells (66).

Bacterial contamination - nanobacteria

Nanobacteria is a recently discovered pathogen that infects humans. Now considered to be the smallest existing bacterial form known to science, it escapes through common filtering processes, and can easily invade other cells and cause cell death. Nanobacteria also are classed as "pleomorphic", that is, they have the ability the change physical form. A human variety of this pathogen has been found to cause or be associated with a host of disease conditions, only a few of which include atherosclerosis, coronary artery / heart disease, kidney stones and kidney disease, arthritis, MS, alzheimers, some cancers, and other conditions (67).

Since this species of bacteria is specific to mammals, and must be lab-cultured in mammalian blood or serum, it is not surprising that this variety of nanobacterium has been isolated as a contaminant from bovine calf serum, other mammaliam bio-products, and vaccines. One study reports that 100% of serum of cattle in a US herd showed antigens to nanobacteria, and cites another report from Europe that, "more than 80% of commercial bovine serum lots contain Nanobacterium" (68). Obviously, any vaccines that must incorporate mammalian products during production (which would include cow, monkey, or human cells, blood or serum), will be prone to nanobacterial contamination. This was indeed verified when a group of researchers found that 2 out of 3 lots of inactivated polio vaccine, and 3 out of 6 lots of veterinary vaccines were contaminated with nanobacteria. They also point out that the bacteria could be coming from calf serum *and* contaminated culture cell lines (69). Any reasoning person with a basic knowledge of vaccine production can deduce that nanobacteria have undoubtedly been infecting humans in a fairly widespread manner via vaccination procedures. One might also wonder whether it has contributed to the current prevalence of atherosclerosis and generalized heart disease.

Bacterial contamination – mycoplasmas and related forms

If there is any one type of bacterial contamination in vaccines that warrants particular attention, it would be mycoplasmas. These small organisms have a structure not characteristic of most forms of bacteria, i.e., they usually contain a thin outer membrane as compared to the more complex walls of common bacterial forms. They are described as being capable of slipping through filtration procedures, and can transfer to other media through the air or via routine handling in the lab (70). One source states that "less than 10% of laboratories actually test for infection/contamination regularly"…that mycoplasmas are "influencing almost every aspect of cell biology"…and that labs "which do not test for mycoplasma probably harbour contaminated cell lines and may even have their entire stocks contaminated, as mycoplasma spreads readily along cell lines via regents and media, the operator and the work surface" (71). They are resistant to certain types of antibiotics used to kill other bacteria (70, 72), and are subject to changing form under varying physiological or biochemical conditions (73).

The journal and industry literature is filled with references to the problems of mycoplasma contamination in cell cultures and vaccines. Various studies cite corrupted cell lines ranging in

occurrence from 5% to 87% (71, 72, 74, 75, 76), and as we now know, once this pathogen is in the cell culture being used to make the vaccine, it is liable to end up in the final product (77, 78, 79,80). One author states, "Mycoplasma contaminants can be considered important not only because of their role as pathogens but also because they may indicate that insufficient care has been taken during vaccine manufacture or quality control." (81). Species of mycoplasmas that have polluted the cell cultures include Mycoplasma hominis, M. fermentans (implicated in Gulf War illness), M. arginini, M. hyorhinis, M. orale, M. pirum, M. pneumoniae, and Acholeplasma laidlawii (75, 76, 82). Any reputable company that sells tissue or cell culture material, also must test for and sell kits to detect mycoplasmas (72, 75, 76, 83, 84).

Mycoplasmas and associated variant forms have long been associated with many disease processes, including cancer, chronic illnesses such as chronic fatigue syndrome, fibromyalgia, arthritis, Gulf War Illness, and many others (73, 85, 86). It would be impossible to cite all the pertinent references in this short report, on this vast arena of microbiology that is often ignored by much of the medical community, sometimes with tragic consequences. Mycoplasmas without question have the capability of altering cell membranes and their antigens, disrupting DNA, and altering cellular metabolism both in vitro and in vivo (70, 71, 72, 73, 86).

Cross-contamination of cell lines

As we recall that all viral vaccines can only be produced with the use of cells, the purity of the cell lines an important issue. The most famous example of many cell lines becoming contaminated from outside sources, occurred when the famous and extremely fastidious HeLa cancer cells started showing up in labs across the world in the 1960s. The phenomenon is well-documented (87, 88, 89, 90), and is even the subject of an entire book (91). One study from 1976 cited a litany of contamination in **all** primary and continuous cell lines that were examined – many viruses were found, as well as HeLa cells (92). As the years progress, the reports continue to come in: one from 1984, for instance, tells of inter- and intra-species cell cross-contamination, that 35% of all cell lines were corrupted, and that most of these lines were (originally) cells of human origin (93).

Let's fast-forward to 1999. A study in Germany finds that the problem is continuing, if not worsening. In a survey of human cell lines, the most common cross-contaminants came from "classic tumor cell lines"; that these polluted lines had been unknowingly used in "several hundred" projects which generated potentially false reports; and that they considered it a "grave and chronic problem demanding radical measures" (94).

The situation is such that several scientists were prompted to write a letter to the respected journal "Nature" in January 2000, calling for immediate action to institute procedures that would verify the purity of cells used for research and production of biological products, ensure freedom from mycoplasma, and include biohazard information (95). (Did I hear that correctly – cells can be considered a biohazard)? Has anything changed since then to remedy the situation? There is another report from Jan. 2002, that two major cell lines used in research projects actually turned out to be HeLa cells (96).

I ask the reader to now recall information from earlier in this report, that there are proposals being considered to produce vaccines and other biological products using distinctly cancerous cell lines, including HeLa (25). Does this seem reasonable, especially since the current lines are already dangerously tainted with HeLa and possibly *other* cancerous cells? Please remember the 100,000,000 allowable pieces of cell-source DNA allowed per dose of vaccine (and this does not include the viral contaminants). Anyone care for a small, under-the-skin serving of human cancer-cell-component soup? With maybe a few monkey cell fragments for garnish, and viruses for flavor?

Additional points to consider

There are several issues the public and medical community may want to be aware of concerning safe administration of vaccines. The human and animal body has normal barriers that help to protect against infiltration by foreign agents, among them are the skin, the respiratory and intestinal mucous linings, and the blood-brain barrier. The puncture of skin by a needle breaches that barrier. A group of researchers states, "Virus contamination of bioproducts such as vaccines, blood products or biological material used in surgery and for transplantations also is more hazardous because the application of contaminating virus usually occurs by circumvention of the natural barrier systems of the body…virus contamination of bioproducts should be considered as a hazard no matter which method has been used for its detection." (97). Of even more concern, is the administration of vaccines nasally (through the nose), or accidental passage via that route (98). Fields Virology text (2001) says, "The olfactory tract has long been recognized as an alternative pathway to the CNS [central nervous system]…olfactory neurons…are unprotected by the blood brain barrier." While that writer particularly addresses the flavivirus family [i.e., "intranasal inoculation of flaviviruses may result in lethal encephalitis" (99)], this pattern of potential danger may deserve further attention than it currently receives, especially if there ever is consideration to use a method of nasal inoculation for mass vaccination of the public or military, and there may be contaminating viruses or toxins in a vaccine that have an affinity for nerve cells and tissues.

Mass immunization programs often use jet injectors to save the time and inconvenience associated with needles and syringes. However, a study published in July 2001, found that the four injectors tested had the capability of transferring tiny amounts of fluid and blood (and thus, viruses such as hepatitis B and C, HIV, etc.) from one recipient to the next (100). Numerous other articles confirm the danger, and question the safety of these devices, including one study that reported an outbreak of hepatitis B associated with use of a jet injector (101, 102).

Some of the newest types of vaccines are called "subunit" and "naked DNA" vaccines. Without going into the intricacies of their production, they involve techniques used in genetic engineering. Subunit vaccines generally will insert a viral or bacterial DNA section into the DNA from yeast, which is allowed to reproduce in large quantities. The protein intended for inclusion in the vaccine is then separated from the yeast cells. In the case of naked DNA vaccines, the viral or DNA gene is first reproduced, then spliced into a plasmid (which is essentially free DNA, widely used in recombinant technology), reproduced in bacteria or cells, and then separated from them for inclusion in the vaccine. Recombinant gene vaccines can also be produced via these methods – for instance, hepatitis B is now an exclusively recombinant vaccine (103, 104)

One of the major concerns with these methods is the unpredictability and interaction of the final vaccine product with the proteins or DNA of the host. A document from the FDA states: "Genetic toxicity: Integration of the plasmid DNA vaccine into the genome of the vaccinated subjects is an important theoretical risk to consider in preclinical studies. The concern is that an integrated vaccine may result in insertional mutagenesis through the activation of oncogenes or inactivation of tumor suppressor genes. In addition, an integrated plasmid DNA vaccine may result in chromosomal instability through the induction of chromosomal breaks or rearrangements." (105). Another group advises, "Research findings in gene therapy and vaccine development show that naked/free nucleic acids constructs are readily taken up by the cells of all species including human beings. These nucleic acid constructs can become integrated into the cell's genome and such integration may result in harmful biological effects, including cancers." (106). And to reiterate the danger of tumorigenic cell lines, a researcher says, "More recently, recombinant DNA technology has expanded beyond bacterial cells to mammalian cells, some of which may also be tumorigenic." (107).

It seems obvious that there needs to be a new and open dialog regarding vaccines among the regulatory agencies, manufacturers, research and medical community, and the public. Many have been ridiculed for refusing vaccination for themselves or their children, but considering the occurrences of short-term adverse events and questionable efficacy (108), possible long-term health

damage, and now also facing the potential of wide-ranging loss of civil liberties (109), is it so surprising that many are questioning what the actual benefits are surrounding most vaccination protocols? Are the cases of damaged children, non-functional adults, the huge increases in cancer rates, immune and chronic diseases to be simply and blindly accepted by the public as "tolerable losses"?

As a citizen with a right to good health, please be advised of the following issues. Vaccine quality in the U.S. relies for the most part, on manufacturers reporting to the FDA. Here is a relevant statement from the CDC: "Manufacturers are required to submit the results of their own tests for potency, safety, and purity for each vaccine lot to the FDA. They are also required to submit samples of each vaccine lot to FDA for testing. However, if the sponsor describes an alternative procedure which provides continued assurance of safety, purity and potency, CBER may determine that routine submission of lot release protocols (showing results of applicable tests) and samples is not necessary." (110) Yes, this is the scope of the quality-control protocol that oversees a market worth billions of dollars, yet allowing all these contaminants into the vaccines.

It may be helpful to have an idea of the scope of the operation to understand what we are dealing with here. We are advised that "Large-scale cell culture operations for biotechnology products use millions of litres of complex media and gases as well as huge quantities of organic and inorganic raw materials. These raw materials must always be assumed to contain contamination by adventitious agents" (111). And because there is a potentially large number of animal and human viruses (or viral segments) that could be entering into the final vaccine products, it would take a equally large bank of molecular probes, as well as frequent, wide-spread testing, to screen for presence of these contaminating agents. This would obviously add time and expense for the manufacturers. What needs to be decided is this – is the effort and cost involved in cleaning up these admittedly filthy medical products, worth the resultant benefit to the public health? And since certain animal products are necessary for the production of vaccines, it may also be necessary to clean house at several levels, including the agricultural sector. It is no secret for instance, that commercial chicken flocks raised for meat and eggs are often carrying infectious avian leucosis virus, mentioned earlier in this report (112, 113, 114)

For the record, the smallpox vaccine ordered by the U.S. government from Aventis is being produced on two types of continuous cell lines, the human embryonic MRC-5 and the green monkey Vero cells (115). We might also be advised of one researcher's thoughts, that "normal embryo and foreskin cells presumably represent a state in development which is genetically unstable, rendering them considerably more susceptible to malignant transformation." (116). Are remnants of these types of cells something we want injected into our bodies?

The decision you make in accepting or refusing a vaccination can be a very personal one, but whatever you decide, do try to be informed of the true benefits and risks. Nobody should be forced to submit to any medical procedure, *especially* one of questionable value.

References / Notes

[Items with a PMID number will usually have abstracts available to read. Go to the PubMed website: http://www4.ncbi.nlm.nih.gov/entrez/query.fcgi and enter the accession number into the search box.]

1. Trijzelaar B. Regulatory affairs and biotechnology in Europe: III. Introduction into good regulatory practice--validation of virus removal and inactivation. Biotherapy 1993; 6(2):93-102. PMID 8398576.

2. Vilcek S. Identification of pestiviruses contaminating cell lines and fetal calf sera. Acta Virol 2001 Apr;45(2):81-6. PMID 11719986.

3. Barkema HW, Bartels CJ, van Wuijckhuise L, Hesselink JW, Holzhauer M, Weber MF, Franken P, Kock PA, Bruschke CJ, Zimmer GM. Outbreak of bovine virus diarrhea on Dutch dairy farms induced by a bovine herpesvirus 1 marker vaccine contaminated with bovine virus diarrhea virus type 2. Tijdschr Diergeneeskd 2001 Mar 15;126(6):158-65. PMID 11285633.

4. Rolleston WB. Bovine serum: reducing the variables through the use of donor herds. Dev Biol Stand 1999;99:79-86. PMID 10404879.

5. Bolin SR, Matthews PJ, Ridpath JF. Methods for detection and frequency of contamination of fetal calf serum with bovine viral diarrhea virus and antibodies against bovine viral diarrhea virus. **:** J Vet Diagn Invest 1991 Jul;3(3):199-203. PMID 1655059.

6. Erickson GA, Landgraf JG, Wessman SJ, Koski TA, Moss LM. Detection and elimination of adventitious agents in continuous cell lines. Dev Biol Stand 1989;70:59-66. PMID 2759356.

7. Yanagi M, Bukh J, Emerson SU, Purcell RH. Contamination of commercially available fetal bovine sera with bovine viral diarrhea virus genomes: implications for the study of hepatitis C virus in cell cultures. J Infect Dis 1996 Dec;174(6):1324-7. PMID 8940226.

8. Giangaspero M, Harasawa R, Verhulst A. Genotypic analysis of the 5'-untranslated region of a pestivirus strain isolated from human leucocytes. Microbiol Immunol 1997;41(10):829-34. PMID 9403511.

9. Harasawa R, Mizusawa H. Demonstration and genotyping of pestivirus RNA from mammalian cell lines. Microbiol Immunol 1995;39(12):979-85. PMID 8789057.

10. Brock, KV. Pathogenesis of BVDV Infections**.** http://www.vetmed.auburn.edu/~brockkv/path.htm and http://www.vetmed.auburn.edu/~brockkv/terms.htm

11. Stoffregen B, Bolin SR, Ridpath JF, Pohlenz J. Morphologic lesions in type 2 BVDV infections experimentally induced by strain BVDV2-1373 recovered from a field case. Vet Microbiol 2000 Nov 15;77(1-2):157-62. PMID 11042409.

12. Meehan JT, Lehmkuhl HD, Cutlip RC, Bolin SR. Acute pulmonary lesions in sheep experimentally infected with bovine viral diarrhoea virus. J Comp Pathol 1998 Oct;119(3):277-92. PMID 9807729.

13. Loken T, Krogsrud J, Bjerkas I. Outbreaks of border disease in goats induced by a pestivirus-contaminated orf vaccine, with virus transmission to sheep and cattle. J Comp Pathol 1991 Feb;104(2):195-209. PMID 1650802.

14. Yolken R, Dubovi E, Leister F, Reid R, Almeido-Hill J, Santosham M. Infantile gastroenteritis associated with excretion of pestivirus antigens. Lancet 1989 Mar 11;1(8637):517-20. PMID 2564059.

15. Potts BJ, Sever JL, Tzan NR, Huddleston D, Elder GA. Possible role of pestiviruses in microcephaly. Lancet 1987 Apr 25;1(8539):972-3.

16. Harasawa R. Latent Risk in Bovine Serums Used for Biopharmaceutic Production. http://www.asmusa.org/pcsrc/sum02.htm

17. Levings RL, Wessman SJ. Bovine viral diarrhea virus contamination of nutrient serum, cell cultures and viral vaccines. Dev Biol Stand 1991;75:177-81. PMID 1665461.

18. http://www.nybloodcenter.org/PatentsAndLicensing/SDTechnology.htm

19. Giangaspero M, Vacirca G, Harasawa R, Buttner M, Panuccio A, De Giuli Morghen C, Zanetti A, Belloli A, Verhulst A. Genotypes of pestivirus RNA detected in live virus vaccines for human use. J Vet Med Sci 2001 Jul;63(7):723-33. PMID 11503899.

20. Harasawa R, Mizusawa H. Detection of Pestiviruses from Mammalian Cell Cultures by the Polymerase Chain Reaction. Proceedings of 3rd Internet World Congress on Biomedical Sciences 1996.12.9-20 Riken, Tsukuba, Japan.
http://www.3iwc.riken.go.jp/CONGRESS/SYMPO/SBB0202/AK0111/TIT.HTM

21. Contreras G, Bather R, Furesz J, Becker BC. Activation of metastatic potential in African green monkey kidney cell lines by prolonged in vitro culture. In Vitro Cell Dev Biol 1985 Nov;21(11):649-52. PMID 4066602.

22. Levenbook IS, Petricciani JC, Elisberg BL. Tumorigenicity of Vero cells. J Biol Stand 1984 Oct;12(4):391-8. PMID 6526826.

23. Furesz J, Fanok A, Contreras G, Becker B. Tumorigenicity testing of various cell substrates for production of biologicals. Dev Biol Stand 1989;70:233-43. PMID 2759351.

24. Letter to Sponsors Using Vero Cells as a Cell Substrate for Investigational Vaccines. Department of Health and Human Services, Public Health Service, Food and Drug Administration, Division of Vaccines and Related Products Applications, March 12, 2001. www.fda.gov/cber/ltr/vero031301.htm

25. U.S. Dept. of Health and Human Services, Public Health Service, Food and Drug Administration, Center for Biologics Evaluation and Research. Evolving Scientific and Regulatory Perspectives on Cell Substrates for Vaccine Development. http://www.fda.gov/cber/minutes/0907evolv.txt

26. Lewis AM Jr. Developing an approach to evaluate the use of neoplastic cells as vaccine substrates. Dev Biol (Basel) 2001;106:37-42; discussion 42-3. PMID 11761251.

27. Purcell DF. Pathogenesis of replication competent retroviruses derived from mouse cells in immunosuppressed primates: implications for use of neoplastic cells as vaccine substrates. Dev Biol (Basel) 2001;106:187-98; discussion 199, 253-63. PMID 11761231.

28. Amosenko FA, Svitkin YV, Popova VD, Terletskaya EN, Timofeev AV, Elbert LB, Lashkevich VA, Drozdov SG. Use of protamine sulphate for elimination of substrate DNA in poliovaccines produced on continuous cell lines. Vaccine 1991 Mar;9(3):207-9. PMID 1645900.

29. Thyagarajan B, McCormick-Graham M, Romero DP, Campbell C. Characterization of homologous DNA recombination activity in normal and immortal mammalian cells. Nucleic Acids Res 1996 Oct 15;24(20):4084-91. PMID 8918816 (full text article available free at this link).

30. Ruscetti SK. Generation of mink cell focus-inducing retroviruses: a model for understanding how viral-viral and viral-cellular interactions can result in biological consequences. Dev Biol (Basel) 2001;106:163-7; discussion 167-8, 253-63. PMID 11761228.

31. Hilleman MR. History, precedent, and progress in the development of mammalian cell culture systems for preparing vaccines: safety considerations revisited. J Med Virol 1990 May;31(1):5-12. PMID 2198327.

32. Butel JS, Lednicky JA. Cell and molecular biology of simian virus 40: implications for human infections and disease. J Natl Cancer Inst 1999 Jan 20;91(2):119-34. PMID 9923853.

33. Arrington AS, Lednicky JA, Butel JS. Molecular characterization of SV40 DNA in multiple samples from a human mesothelioma. Anticancer Res 2000 Mar-Apr;20(2A):879-84. PMID 10810370.

34. Vilchez RA, Madden CR, Kozinetz CA, Halvorson SJ, White ZS, Jorgensen JL, Finch CJ, Butel JS. Association between simian virus 40 and non-Hodgkin lymphoma. Lancet 2002 Mar 9;359(9309):817-23. PMID 11897278.

35. Shivapurkar N, Harada K, Reddy J, Scheuermann RH, Xu Y, McKenna RW, Milchgrub S, Kroft SH, Feng Z, Gazdar AF. Presence of simian virus 40 DNA sequences in human lymphomas. Lancet 2002 Mar 9;359(9309):851-2. PMID 11897287.

36. Bu X, Zhang X, Zhang X, et Al. A study of simian virus 40 infection and its origin in human brain tumors. Zhonghua Liu Xing Bing Xue Za Zhi 2000 Feb;21(1):19-21. PMID 11860751.

37. Butel JS, Jafar S, Wong C, Arrington AS, Opekun AR, Finegold MJ, Adam E. Evidence of SV40 infections in hospitalized children. Hum Pathol 1999 Dec;30(12):1496-502. PMID 10667429.

38. von Mettenheim AE. Studies on simian viruses as possible contaminants of inactivated virus vaccines. I. Direct and serologic detection of simian adenovirus SV20. Zentralbl Bakteriol [Orig A] 1975 Jul;232(2-3):131-40. PMID 1179876.

39. Schuurman R, van Steenis B, Sol C. Bovine polyomavirus, a frequent contaminant of calf serum. Biologicals 1991 Oct;19(4):265-70. PMID 1665699.

40. Nettleton PF, Rweyemamu MM. The association of calf serum with the contamination of BHK21 clone 13 suspension cells by a parvovirus serologically related to the minute virus of mice (MVM). Arch Virol 1980;64(4):359-74. PMID 7396725.

41. Fong CK, Gross PA, Hsiung GD, Swack NS. Use of electron microscopy for detection of viral and other microbial contaminants in bovine sera. J Clin Microbiol 1975 Feb;1(2):219-24. PMID 51855.

42. Erickson GA, Bolin SR, Landgraf JG. Viral contamination of fetal bovine serum used for tissue culture: risks and concerns. Dev Biol Stand 1991;75:173-5. PMID 1665460.

43. Kniazeff AJ, Wopschall LJ, Hopps HE, Morris CS. Detection of bovine viruses in fetal bovine serum used in cell culture. In Vitro 1975 Nov-Dec;11(6):400-3. PMID 172434.

44. Michalski FJ, Dietz A, Hsiung GD. Growth characteristics of bovine herpesvirus 1 (infectious bovine rhinotracheitis) in human diploid cell strain WI-38. Proc Soc Exp Biol Med 1976 Feb;151(2):407-10. PMID 175382.

45. Egyed L. Bovine herpesvirus type 4: a special herpesvirus (review art icle). Acta Vet Hung 2000;48(4):501-13. PMID 11402667.

46. Egyed L. Replication of bovine herpesvirus type 4 in human cells in vitro. J Clin Microbiol 1998 Jul;36(7):2109-11. PMID 9650976.

47. Johnson ES. Poultry oncogenic retroviruses and humans. Cancer Detect Prev 1994;18(1):9-30. PMID 8162609.

48. For example, see Nevins JR, "Cell Transformation by Viruses", in Knipe DM et al (ed.), 2001. Fields Virology (4th ed), Vol. I, chapter 10, p.245-283. Lippincott.
Also see Joklik WK, "Tumor Viruses", in Joklik WK et al, 1992. Zinsser Microbiology (20th ed), chapter 59, p.869-905. Appleton & Lange.

49. Felder MP, Eychene A, Laugier D, Marx M, Dezelee P, Calothy G. Steps and mechanisms of oncogene transduction by retroviruses. Folia Biol (Praha) 1994;40(5):225-35. PMID 7895853.

50. Harris RJ, Dougherty RM, Biggs PM, Payne LN, Goffe AP, Churchill AE, Mortimer R. Contaminant viruses in two live virus vaccines produced in chick cells. J Hyg (Lond) 1966 Mar;64(1):1-7. PMID 4286627.

51. Payne LN, Biggs PM, Chubb RC, Bowden RS. Contamination of egg-adapted canine distemper vaccine by avian leukosis virus. Vet Rec 1966 Jan 8;78(2):45-8. PMID 4285488.

52. Knipe DM et al (ed.) 2001. Fields Virology (4th ed), Vol. I, p.1103. Lippincott.

53. Johnson JA, Heneine W. Characterization of endogenous avian leukosis viruses in chicken embryonic fibroblast substrates used in production of measles and mumps vaccines. J Virol 2001 Apr;75(8):3605-12. PMID 11264350.

54. Maudru T, Peden KW. Analysis of a coded panel of licensed vaccines by polymerase chain reaction-based reverse transcriptase assays: a collaborative study. J Clin Virol 1998 Jul 24;11(1):19-28. PMID 9784140.

55. Tsang SX, Switzer WM, Shanmugam V, Johnson JA, Goldsmith C, Wright A, Fadly A, Thea D, Jaffe H, Folks TM, Heneine W. Evidence of avian leukosis virus subgroup E and endogenous avian virus in measles and mumps vaccines derived from chicken cells: investigation of transmission to vaccine recipients. J Virol 1999 Jul;73(7):5843-51. PMID 10364336.

56. Hussain AI, Shanmugam V, Switzer WM, Tsang SX, Fadly A, Thea D, Helfand R, Bellini WJ, Folks TM, Heneine W. Lack of evidence of endogenous avian leukosis virus and endogenous avian retrovirus transmission to measles, mumps, and rubella vaccine recipients. Emerg Infect Dis 2001 Jan-Feb;7(1):66-72. PMID 11266296. Full article text available at www.cdc.gov/ncidod/eid/vol7no1/hussain.htm

57. Arshad SS, Howes K, Barron GS, Smith LM, Russell PH, Payne LN. Tissue tropism of the HPRS-103 strain of J subgroup avian leukosis virus and of a derivative acutely transforming virus. Vet Pathol 1997 Mar;34(2):127-37. PMID 9066079.

58. Johnson ES, Overby L, Philpot R. Detection of antibodies to avian leukosis/sarcoma viruses and reticuloendotheliosis viruses in humans by western blot assay. Cancer Detect Prev 1995;19(6):472-86. PMID 8925516.

59. Raines MA, Maihle NJ, Moscovici C, Crittenden L, Kung HJ. Mechanism of c-erbB transduction: newly released transducing viruses retain poly(A) tracts of erbB transcripts and encode C-terminally intact erbB proteins. J Virol 1988 Jul;62(7):2437-43. PMID 2897475.

60. Joklik WK, "Tumor Viruses", in Joklik WK et al, 1992. Zinsser Microbiology (20th ed.), chapter 59, p.889. Appleton & Lange.

61. Geier MR, Stanbro H, Merril CR. Endotoxins in commercial vaccines. Appl Environ Microbiol 1978 Sep;36(3):445-9. PMID 727776.

62. Kreeftenberg JG, Loggen HG, van Ramshorst JD, Beuvery EC. The limulus amebocyte lysate test micromethod and application in the control of sera and vaccines. Dev Biol Stand 1977;34:15-20. PMID 838139.

63. Sharma SK. Endotoxin detection and elimination in biotechnology. Biotechnol Appl Biochem 1986 Feb;8(1):5-22. PMID 3548752.

64. Fumarola D, Panaro A, Palma R, Mazzone A. Endotoxic contamination of biological products (ribosomal vaccines, viral vaccines and interferon). G Batteriol Virol Immunol 1979 Jan-Jun;72(1-6):72-7. PMID 95449.

65. Cussler K, Godau H, Gyra H. Investigation of the endotoxin content of veterinary vaccines. ALTEX 1994;11(5):24-29. PMID 11178403.

66. Whitaker AM, Smith EM. Effect of bacterial toxins in serum on the chromosomes of WI-38. Dev Biol Stand 1976 Dec 13-15;37:185-90. PMID 801471.

67. See "What are nanobacteria?" at http://www.nanobaclabs.com/PageDisplay.asp?p1=6578

68. Breitschwerdt EB, Sontakke S, Cannedy A, Hancock SI, Bradley JM. Infection with Bartonella weissii and detection of Nanobacterium antigens in a North Carolina beef herd. J Clin Microbiol 2001 Mar;39(3):879-82. PMID 11230398. Full article text available at http://jcm.asm.org/cgi/content/full/39/3/879?view=full&pmid=11230398

69. Nanobacteria detected in vaccines. NanoNews 2001 July;1(2). Article available at http://www.nanobaclabs.com/Files/Newsletter/JulyNANONEWS1.pdf

70. Cell Culture Contamination Example. Mycoplasma. http://www.unc.edu/depts/tcf/mycoplasma.htm

71. Prasad E, Lim-Fong R. Mycoplasmas. http://www2.provlab.ab.ca/bugs/biologos/9702mypl.htm

72. Mycoplasma Detection Kit. http://www.atcc.org/Products/MycoplasmaDetectKit.cfm

73. Mattman LH, 2001. Cell wall deficient forms: stealth pathogens (3rd ed.). CRC Press.

74. Uphoff CC, Drexler HG. Prevention of mycoplasma contamination in leukemia-lymphoma cell lines. Hum Cell 2001 Sep;14(3):244-7. PMID 11774744.

75. Mycoplasma Detection and Elimination. http://www.dsmz.de/mutz/mutzmyco.htm

76. Mycoplasma Detection Kit. http://www.biovalley.fr/anglais/biology/mob_cc.htm

77. Kojima A, Takahashi T, Kijima M, Ogikubo Y, Tamura Y, Harasawa R. Detection of mycoplasma DNA in veterinary live virus vaccines by the polymerase chain reaction. J Vet Med Sci 1996 Oct;58(10):1045-8. PMID 8916012.

78. Kojima A, Takahashi T, Kijima M, Ogikubo Y, Nishimura M, Nishimura S, Harasawa R, Tamura Y. Detection of Mycoplasma in avian live virus vaccines by polymerase chain reaction. Biologicals 1997 Dec;25(4):365-71. PMID 9467032.

79. Benisheva T, Sovova V, Ivanov I, Opalchenova G. Comparison of methods used for detection of mycoplasma contamination in cell cultures, sera, and live-virus vaccines. Folia Biol (Praha) 1993;39(5):270-6. PMID 8206173.

80. Nicolson GL, Nass M, Nicolson N. Anthrax vaccine: controversy over safety and efficacy. Antimicrobics and Infectious Disease Newsletter (Elsevier Science) 2000. Article located at http://www.flatlandbooks.com/anthrax.html

81. Thornton DH. A survey of mycoplasma detection in veterinary vaccines. Vaccine 1986 Dec;4(4):237-40. PMID 3799018.

82. Kong F, James G, Gordon S, Zelynski A, Gilbert GL. Species-specific PCR for identification of common contaminant mollicutes in cell culture. Appl Environ Microbiol 2001 Jul;67(7):3195-200. PMID 11425741.

83. Mycoplasma testing by PCR. http://locus.umdnj.edu/nia/qc/myco.html

84. Mycoplasma sp. Reagent Set. http://www.euroclone.net/mol_biology/mycoplasma.htm

85. Macomber PB. Cancer and cell wall deficient bacteria. Med Hypotheses 1990 May;32(1):1-9. PMID 2190063.

86. Baseman JB, Tully JG. Mycoplasmas: sophisticated, reemerging, and burdened by their notoriety. Emerg Infect Dis 1997 Jan-Mar;3(1):21-32. PMID 9126441. Full text article available at http://www.cdc.gov/ncidod/eid/vol3no1/baseman.htm

87. Gartler SM. Apparent Hela cell contamination of human heteroploid cell lines. Nature 1968 Feb 24;217(5130):750-1. PMID 5641128.

88. Lavappa KS. Survey of ATCC stocks of human cell lines for HeLa contamination. In Vitro 1978 May;14(5):469-75. PMID 566722.

89. Nelson-Rees WA, Daniels DW, Flandermeyer RR. Cross-contamination of cells in culture. Science 1981 Apr 24;212(4493):446-52. PMID 6451928.

90. Gold M. The cells that would not die. Science 81 1981 April; 29-35.

91. Gold M, 1986. A Conspiracy of Cells: One Woman's Immortal Legacy and the Medical Scandal It Caused. State University of New York Press.

92. Demidova SA, Tsareva AA, Mikhailova GR, Perekrest VV, Gushchin BV. Several methodologic problems in the control of cell cultures. Vopr Virusol 1976 May-Jun;(3):371-9. PMID 983006.

93. Hukku B, Halton DM, Mally M, Peterson WD Jr. Cell characterization by use of multiple genetic markers. Adv Exp Med Biol 1984;172:13-31. PMID 6328905.

94. MacLeod RA, Dirks WG, Matsuo Y, Kaufmann M, Milch H, Drexler HG. Widespread intraspecies cross-contamination of human tumor cell lines arising at source. Int J Cancer 1999 Nov 12;83(4):555-63. PMID 10508494.

95. Stacey GN. Cell contamination leads to inaccurate data: we must take action now. Nature 2000 Jan 27;403(6768):356. PMID 10667765.

96. Kniss DA, Xie Y, Li Y, Kumar S, Linton EA, Cohen P, Fan-Havard P, Redman CW, Sargent IL. ED(27) Trophoblast-like Cells Isolated from First-trimester Chorionic Villi are Genetically Identical to HeLa Cells Yet Exhibit a Distinct Phenotype. Placenta 2002 Jan;23(1):32-43. PMID 11869090.

97. Buttner M, Oehmig A, Weiland F, Rziha HJ, Pfaff E. Detection of virus or virus specific nucleic acid in foodstuff or bioproducts--hazards and risk assessment. Arch Virol Suppl 1997;13:57-66. PMID 9413526.

98. Monath TP, Cropp CB, Harrison AK. Mode of entry of a neurotropic arbovirus into the central nervous system. Reinvestigation of an old controversy. Lab Invest 1983 Apr;48(4):399-410. PMID 6300550.

99. Burke DS, Monath TP, "Flaviviruses", in Knipe DM et al (ed.), 2001. Fields Virology (4th ed), Vol. I, chapter 33, p.1057. Lippincott.

100. Hoffman PN, Abuknesha RA, Andrews NJ, Samuel D, Lloyd JS. A model to assess the infection potential of jet injectors used in mass immunisation. Vaccine 2001 Jul 16;19(28-29):4020-7. PMID 11427278.

101. Canter J, Mackey K, Good LS, Roberto RR, Chin J, Bond WW, Alter MJ, Horan JM. An outbreak of hepatitis B associated with jet injections in a weight reduction clinic. Arch Intern Med 1990 Sep;150(9):1923-7. PMID 2393323.

102. Brink PR, van Loon AM, Trommelen JC, Gribnau FW, Smale-Novakova IR. Virus transmission by subcutaneous jet injection. J Med Microbiol 1985 Dec;20(3):393-7. PMID 4068027.

103. McAleer WJ, Buynak EB, Maigetter RZ, Wampler DE, Miller WJ, Hilleman MR. Human hepatitis B vaccine from recombinant yeast. Nature 1984 Jan 12-18;307(5947):178-80. PMID 6318124.

104. Hilleman MR. Yeast recombinant hepatitis B vaccine. Infection 1987 Jan-Feb;15(1):3-7. PMID 2437037.

105. Points to Consider on Plasmid DNA Vaccines for Preventive Infectious Disease Indications. Food and Drug Administration, Center for Biologics Evaluation and Research, Office of Vaccine Research and Review, December 1996. Full article available at http://www.fda.gov/cber/gdlns/plasmid.txt

106. Ho M, Ryan A, Cummins J, Traavik T. Slipping through the regulatory net: 'Naked' and 'free' nucleic acids. TWN Biotechnology and Biosafety Series No. 5, 2001. Available at http://www.twnside.org.sg/title/biod5.htm

107. Petricciani JC. Safety issues relating to the use of mammalian cells as hosts. Dev Biol Stand 1985;59:149-53. PMID 3891461.

108. Phillips A. Dispelling vaccination myths: an internationally published, referenced report. 1998. Report available at http://www.unc.edu/~aphillip/www/chf/myths/dvm1.htm
For statistics regarding adverse events, see the link at http://www.unc.edu/~aphillip/www/chf/myths/dvm11.htm

109. See a discussion of issues surrounding proposed forced smallpox vaccination at: Fisher, BL. Smallpox and forced vaccination: what every American needs to know. The Vaccine Reaction, Winter 2002. Article available at http://www.909shot.com/smallpoxspecialrpt.htm. The entire text of the Model State Emergency Health Powers Act, currently being considered by the various U.S. state governments is available at http://www.publichealthlaw.net/MSEHPA/MSEHPA2.pdf

110. National Vaccine Program Office, Vaccine Fact Sheets: Vaccine Product Approval Process. Article available at http://www.cdc.gov/od/nvpo/fs_tableII_doc2.htm

111. Garnick RL. Raw materials as a source of contamination in large-scale cell culture. Dev Biol Stand 1998;93:21-9. PMID 9737373.

112. Fadly AM, Smith EJ. Isolation and some characteristics of a subgroup J-like avian leukosis virus associated with myeloid leukosis in meat-type chickens in the United States. Avian Dis 1999 Jul-Sep;43(3):391-400. PMID 10494407.

113. Grunder AA, Benkel BF, Chambers JR, Sabour MP, Gavora JS, Dickie JW. Characterization of four endogenous viral genes in semi-congenic lines of meat chickens. Poult Sci 1999 Jun;78(6):873-7. PMID 10438132.

114. Pham TD, Spencer JL, Johnson ES. Detection of avian leukosis virus in albumen of chicken eggs using reverse transcription polymerase chain reaction. J Virol Methods 1999 Mar;78(1-2):1-11. PMID 10204692.

115. http://www.worldnetdaily.com/news/article.asp?ARTICLE_ID=25538

116. Kopelovich L. Are all normal diploid human cell strains alike? Relevance to carcinogenic mechanisms in vitro. Exp Cell Biol 1982;50(5):266-70. PMID 7141068.