

Vulnerability: food safety and research are common denominators in guaranteeing food safety and defense concerns in any society

William P. Switzer

Neuroscience Research Institute, State University of New York Old Westbury, USA

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Corresponding author:

William P. Switzer, DVM, MS,

PhD, Dr. h.c.

Distinguished Prof. Emeritus Ia.

State Univ., Research Associate

Phone: 515-268-5205

E-mail billswitzer@ghhome.com

Over time a Society evolves due to its increasing complexity, changing its level of expectation of the individuals responsibility for their own personal welfare and their expectation of a State or National entity to provide for them. This evolution is gradual but over time places extreme but unintentional pressures on essential components that are designed for the welfare of the Society.

We are fast approaching this stage in regards to the situation in many of the developed countries, including the USA. The problem is how we can continue the production of adequate food to feed the rapidly increasing population of the world, including the USA. This is a problem so important that we must begin to solve it now) (<http://www.aasp.org/shap/issues/v17n6/v17n6advocacy.htm>)(<http://www.ers.usda.gov/Publications/EIB45/>). This requires a marked increase in the visionary development of both present and new food production ability that maintain the quality and safety of the food, which can be easily abused.

The national census of 1850 was the watershed for distribution of Rural and Urban population in the USA. The industrial revolution that characterized the period from the late 1800s until the early 1900s accelerated this shift of the USA population from Rural to Urban. The replacement of human labor required for food production with machine labor in the early 1900s accelerated the decline in the amount of human labor required for food production until today where about 1.5% of the total USA population produce the major portion of the food for the remaining 98.5% of the population. An example of this is that the year 1940 was the first year that the nations corn crop averaged 40 bushels an acre. Today the 2009 national average bushel per acre production is predicted to be 156 bushels per acre. Chicken, egg, turkey, and swine production has become concentrated into very large units. The dairy industry is approaching that state and there is preliminary indication that some portion of beef production may go that route. The 94 million dairy and beef animals are currently valued at \$49,000,000,000.00 (<http://www.genome.gov/27531571>). Egg farms now have as many as 3.6 million hens in a single farm. We now have the major portion of our population with difficulty identifying the origin of their food beyond the supermarket. This has resulted in a tremendous reduction in the voting power of production Agriculture.

The estimated value of the livestock and poultry component of the agriculture enterprise is in excess of \$135,000,000,000.00

(<http://www.aasp.org/shap/issues/v17n6/v17n6advocacy.htm>). The U.S. Department of Agriculture serves as the principal government agency for agricultural research and development. The FY 2009 budget of the USDA is approximately \$95,000,000,000 (<http://www.aaas.org/spp/rd/09pch10.htm>) which seem like an adequate amount of the Federal budget to devote to the development, production and security of the USA food supply. But it fails to do that because 76% of this amount is allocated to support mandatory programs such as farm commodity programs, school luncheon programs, nutrition programs, and other welfare programs. The remaining 24% of the budget funds several other components, only one of which is research. Most of the USDA research funds are expended on in house research. The cooperative Federal-State Land-grant program receives about \$139,000,000. And finally the funding for competitive multi-state crop and livestock research is \$98,000,000 (<http://www.aaas.org/spp/rd/09pch10.htm>). These competitive research funds are not likely to produce visionary research. These funds are inadequate for this function. These various programs theoretically should offer the USDA a considerable degree of voter security but do little to stimulate the necessary visionary research on new food production techniques that will be essential to produce the future safe food needed to feed our increasing population.

Pressure on most other Federal agencies budgets is also increasing (<http://www.sciencemag.org/cgi/content/full/324/5926/528>) <http://www.sciencemag.org/content/vol324/issue5926/index.dtl>). One of the first reactions that budget pressure produces is to reduce the funding for commercial food research and safety in order to divert resources to meet immediate needs. And this pressure within research makes it necessary that the limited research expenditures produce results that are of predictable, quantifiable application. This quickly narrows the research program to subjects based on existing knowledge. The knowledge base is polished in a decimal fashion. Visionary research is avoided because it is unpredictable. But it is the breakthroughs that result from visionary research in health and food areas that will enable us to meet the need to feed our increasing human population safely.

Despite very limited funding novel concepts are emerging that may link many disciplines, human and animal in a health concept referred to as "One Medicine", taking advantage of novel gene microarray expression technologies [1-14]. It is no surprise that, for example mu opioid receptors are present in commercial animal and they have functions that transcend pain and substance abuse [11, 15-17].

They may even serve as bioindicators for disorders in both animal and plants. There are a new array data of plants that were once thought only to exist in plants and now shown to have animal counterparts, which could be coupled to homeland security issues. Concepts such as these that promise to meet the growing demands for safety and health in the commercial food industry must be examined in order to fully use the One Medicine Hypothesis based on molecular commonalities, thus ensuring all commercial animals' health and safety for human consumption.

This is all occurring at the first time in our countries history that our enemies have valid, demonstrated ability to seriously damage our homeland without setting foot on it. The security of our food supply is an easy target and must receive top priority in the effort to defend our homeland against foreign damage such as poisoning our food supply. We must develop a higher priority for funding visionary research. Historically, hungry human populations fuel unrest, revolt and war, let us not fuel a repeat of history by neglecting quality and safety concerns.

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