

Dr. LEGATOR. If we look at the type of response that one gets say in the induction of a neoplasm which really is not a common phenomenon of most chemicals that are even given under extreme conditions. In a recent study where we looked at over 100 pesticides only 10 percent would produce damage, even when administered at maximally tolerated doses.

Therefore, when one sees an effect in animals when the experiment is properly done, even at concentrations that are considerably higher than the actual usage it has to be taken quite seriously.

Senator NELSON. When you say the compound, whatever it may be, is used in concentrations considerably higher on the animal experiment than it would be used in a pill for a human being, are you saying that it is a relative matter? In other words, you have a 2-pound rat receiving the same dosage of estrogens, say, as a 130-pound woman. Is this what you are talking about?

Dr. LEGATOR. Yes, what we are saying here is we have a dose response curve, in other words with our increasing concentrations we get an increasing effect whatever the effect is that we are measuring, so instead of saying 0.1 of 1 percent by increasing our dosage we can measure a response in 1, 5, or 10 percent of the treated animals. We are measuring that part of the curve we can measure in our limited animal population and assuming that there is an effect at a lower concentration.

Senator NELSON. Well now, is it correct that all compounds and chemicals which have been found to induce carcinoma in human beings do, in fact, induce it in animals?

Dr. LEGATOR. That is correct, but the reverse is not true. I think there may be one exception.

Senator NELSON. Are you saying the reverse is not true or the reverse has not been proved?

Dr. LEGATOR. It has not been proved would be a much more correct statement. There is one possible exception. Arsenic may be an exception to this rule. We don't know this as yet. But by and large the compounds that have been found to be carcinogenic in the human population, with the possible exception of arsenic, have also been uncovered in animal experimentation.

Senator NELSON. If a compound or chemical is administered to a human being of a weight of 130 to 140 pounds, and you administered the same compound or chemical in an experiment to an animal weighing 2 pounds, and if what you sought to find out was whether or not the chemical or compound would induce carcinoma of the cervix, in the dosage given to the human species, is it fair to draw a conclusion, sometimes a direct conclusion, if the dosage given to the human species induces cancer of the cervix of the rat on the ground that the tissue in any event is the same or similar anyway, is that the kind of thing we are talking about?

Dr. LEGATOR. That is not quite valid because we do know that there are differences in different animals with the same compounds in the terms of organ specificity so this is obviously not correct, and I should point out that the animal experiments that one designs are really one of the few alternatives that one has in this area of genetic toxicity short of mass experimentation on the population and obviously we can't extrapolate a hundred percent or anywhere near this but yet this is one of the few tools we have to work with.