

The Antitoxic Effect of Plaferon LB on Pesticides in Tissue Culture Model

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Abstract

The antitoxic action of the preparation plaferon LB in the co inoculating cell lines of human and animal origin has been studied. Phosphoorganic compounds - pesticides, phosphamide, decis, and paarlan were used as toxic substances. In the indicated cells, pesticides caused (induced) cytotoxic, morphological and mutagenetic changes which degree depended on the kind of the toxins and cells being used. Mice (C-1300) neuro blastoma cells proved to be the most sensitive. A comparatively low sensibility was shown by pig embryo cells in which considerable morphological and cytogenetic changes were observed 48 hr after pesticides contact, especially under the action of paarlan. Preliminary processing of the cells with the preparation plaferon LB caused their partial protection from the cytotoxic and mutagenetic action of the pesticides used. On the basis of the results we have obtained, it's possible to suppose that the usage of plaferon LB for the prophylactic, as well as therapeutic purposes will considerably relieve consequences of pesticide-caused intoxication.

Keywords: *cell culture, plaferon LB, pesticides, toxin, morphological, mutagenetic, cytopathogenetic effects*

Wide and out-of -control use of pesticides in agriculture has strongly increased the amount of acute and chronic poisonings, allergies and cancerous diseases. This problem is connected with the steadiness and high level of pesticides accumulation in the environment [3,4]. The understanding and study of this problem has a huge ecological and social meaning. There exists an urgent need to search for such kind of antitoxic preparations able to decrease the risk of damage caused by pesticides.

Objective: To study a clear antitoxic effect of plaferon LB [1,2] on cells culture model (Its healing and protective effect).

Materials and methods: Human and animal cell cultures: L-41 human lung diploid cells; СПЭВ - pig embryo kidney cells, C-1300 mouse neuroblastoma cells.

Pesticides: dichlophos, paarlane and decis.

At first the dissolution of the given pesticide had been performed, until the optimal dosage was found: 0,0001Mg per 1000000 cells.

Three versions of the experiment were conducted:

1. Cellular culture was grown in a test tube. Plaferon had been introduced into a cell monolayer 24 hours before the pesticide was added.
2. Only the pesticide was introduced into the cell culture.
3. The cells control.

After a two-hour contact, the pesticides were spilled out, new culture fluid was added and cells were incubated at 37°C. Fixation was done 24 and 48 hours later in Buen's solution, and the preparations were stained with Azur-eosin. The influence of plaferon on morphological and cytogenetic changes caused by pesticides was observed via microscope, CPE marked with crosses (View *Tab.1*).

Pesticides	L-41		СПЭВ		C-1300	
	24	48	24	48	24	48
Phosphamide	1	+	++	-	-	++++
	2	++	+++	+	++	++++
	3	-	-	-	-	-
Paarlane	1	++	+++	-	+	++++
	2	+++	++++	+	+++	++++
	3	-	-	-	-	-
Decis	1	+	++	-	-	++++
	2	++	+++	+	++	++++
	3	-	-	-	-	-

Tab.1 Influence of plaferon LB on morphological and cytogenetic changes by pesticides.

+ 20-25% of cell destruction
++ 40-50%
+++ 70-75%
++++ 90-100%

After observing the preparation, it was discovered that in the second version of the experiment all three pesticides had more or less equal toxic action on human lung diploid cells. Only in case of paarlane we received a different picture: a huge amount of cells were disquammed, especially 48 hours later. In a small quantity of the left cells (15-20%) there was visible an obvious increase of morphological and cytogenetic changes: giant multinuclear cells, strong hyperplasia of the cytoplasm and nuclei, polyploid chromosomes and mutation in telophase with fragmentation and produced small bridges. In case of phosphamide there was a strong hyperplasia and giant cell producing. However, in some parts, a visible activation of mitosis and cells multilayer growth took place that is usually out of the normal range. Pig embryo kidney cells (СПЭВ) proved to be less sensitive to the used chemicals.

48 later most of the cells were desquamated, but there were not some serious morphological changes in the

cells left. After 24 hours a total lisis of the mouse neuroblastoma cells (C-1300) occurred.

In the first version of the experiment, L-41 cells, pre-cultivated by plaferon, were partly desquamated, but they did not underwent morphological and cytogenetic changes. In pig embryo kidney cells (СПЭВ) the whole monolayer was well preserved, and only few cells were desquamated. Few calls also had strong morphological changes in case of C-q300 mouse neuroblastoma cells, those points to the high sensitivity of nerve cells to pesticides. In all cases cell control was within the normal limits.

According to the received data we are able to conclude that plaferon has a strong antitoxic and antimutagenic activity that can be used for prophylaxis and treatment, also for avoiding many diseases and hazards possibly connected with the usage of pesticides.

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Изучение антитоксического действия плаферона ЛБ в эксперименте

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Р Е З Ю М Е

Изучено антитоксическое действие препарата плаферон ЛБ в перевиваемых линиях клеток человеческого и животного происхождения. В качестве токсических веществ были использованы фосфоорганические соединения - пестициды: фосфамид, децис и паарлан. Пестициды в указанных клетках вызывали цитотоксические, морфологические и мутагенные изменения, степень которых зависела от вида используемых клеток и токсинов. Наиболее чувствительными оказались нейробластомные клетки мышей (линия С-1300). Сравнительно низкую чувствительность выявили клетки почек эмбриона свиньи (СПЭВ), в которых значительные морфологические и цитогенетические изменения наблюдались через 48 часов контакта с пестицидами, особенно под действием паарлана. Предварительная обработка клеток препаратом плаферон ЛБ вызывала частичную защиту клеток от цитотоксического и мутагенного действия используемых пестицидов. На основании полученных результатов можно предположить, что использование плаферона ЛБ как для профилактической, так и лечебной цели значительно облегчит последствия интоксикации, вызванной пестицидами.

Ключевые слова: *клеточная культура, плаферон ЛБ, пестициды, токсин, морфологический, мутагенный, цитопатогенный эффекты*