VACCINES IN CANCER IMMUNOTHERAPY: EXPERIENCE OF UKRAINIAN ONCOLOGISTS

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LABORATORY OF ONCOIMMUNOLOGY AND CANCER VACCINE DEVELOPMENT

Riga-2016
POSSIBILITIES OF CANCER VACCINE PREPARATION

- (1) synthetic tumor-associate antigens, in the form of either short peptides or full-length proteins;
- (2) whole tumor lysates, containing tumor-associate antigens alone or complexed with chaperones;
- (3) tumor-associate antigens-encoding vectors, in the form of naked DNA or RNA;
- (4) DC-based vaccines, including DCs loaded with tumor-associate antigens ex vivo as well as fusion proteins that allow for the selective delivery of TAAs to DCs in vivo.

BASIC REQUIREMENTS FOR CANCER VACCINES:

- safety;
- effectiveness against a wide range of histological tumor types;
- immunogenicity;
- stability under long-term preservation;
- easy to use.
In Ukraine, the development of cancer vaccines and research on cancer immunotherapy have been initiated by Professor D.G. Zatula

DMYTRO GRIGOROVICH ZATULA
(11.02.1923-09.06.1987),
Corresponding Member of Academy of Sciences of USSR,
Head of Natural Anticancer Substances
The original technology of preparation of cancer vaccine from autologous tumor material modified with cytotoxic lectin of *B. subtilis* B-7025 has been developed.
Our study has been carried out on C57Bl/6 mice (males, 2–2.5 months old).

The use and care of the experimental animals have been performed in accordance with the standard international rules of biologic ethics and was approved by Institutional Animal Care and Use Committee.
CANCER AUTOVACCINE (CAV)

Lewis lung carcinoma, melanoma B-16, Ehrlich carcinoma, sarcoma 37.

In vivo studies on different experimental tumor models (including metastatic Lewis lung carcinoma) have shown that CAV-based immunotherapy resulted in suppression of primary tumor growth.
EXPERIMENTAL STUDIES

VACCINATION SCHEDULES

- prior to tumor cells injection
  
  CAV was injected (s.c.) three times with one-week intervals. 30 days after the last immunization, LLC was transplanted

  Dose:
  - 0.5; 0.75 and 1 ml per mouse

- after tumor removal
  
  CAV was injected (s.c.) on third day after the tumor removal, five times after two days on the third

  Dose:
  - 0.3; 0.3; 0.3; 0.5 and 0.5 ml per mouse
The studies were performed in accordance with the Law of Ukraine on «Pharmaceutical products» and the requirements and principles of Declaration of Helsinki and Ethical Principles for Medical Research Involving Human Subjects (1964).

The program of the research was allowed by Commission of Bioethics of Medical institutions.

The patients provided an informed written consent on participation in the research.
ADMINISTRATION OF CANCER AUTOVACCINE

- A complete treatment course consists of 3 injections with 7 days intervals and following revaccinations 1 and 6 months later.

- As a rule, the first vaccination is performed at 10-14 days after the surgery dependent on post-surgical period course and indications for other therapeutic interventions.

- If adjuvant courses of radiotherapy or chemotherapy are performed, then administration of autovaccine should began in 18-21 days after their termination.
Clinical trials of CAV were performed in the patients with

<table>
<thead>
<tr>
<th>LOCALIZATION OF TUMOR</th>
<th>Control group, N</th>
<th>Main group, N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colorectal cancer</td>
<td>550</td>
<td>189</td>
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<tr>
<td>Gastric cancer</td>
<td>70</td>
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<tr>
<td>Lung cancer</td>
<td>382</td>
<td>52</td>
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<tr>
<td>Breast cancer</td>
<td>194</td>
<td>128</td>
</tr>
<tr>
<td>Malignant brain tumors</td>
<td>140</td>
<td>45</td>
</tr>
<tr>
<td>LOCALIZATION OF TUMOR</td>
<td>3-years</td>
<td>5-years</td>
</tr>
<tr>
<td>----------------------------</td>
<td>---------------</td>
<td>---------------</td>
</tr>
<tr>
<td></td>
<td>Surgery</td>
<td>Surgery+CAV</td>
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<tr>
<td>Colon cancer</td>
<td>56,7±9,1</td>
<td>78,6±10,9</td>
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<tr>
<td>Rectal cancer</td>
<td>69,9±2,7</td>
<td>80,2±4,0 *</td>
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<tr>
<td>Gastric cancer</td>
<td>48,0±8,0</td>
<td>70,0±6,0 *</td>
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<tr>
<td>Lung cancer</td>
<td>18,0±3,0</td>
<td>52,6±8,4 *</td>
</tr>
<tr>
<td>Breast cancer</td>
<td>65,0±6,0</td>
<td>82,4±6,0*</td>
</tr>
</tbody>
</table>
Україна
Міністерство охорони здоров'я
Державна служба
Лікарських засобів і засобів медичного призначення
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Сертифікат про державну реєстрацію
медичного імунобіологічного препарату
№ 411/03-300200000
від 09 грудня 2003 р.

Противухілинна аутовалія

1. Торговельна назва

2. Форма випуску, доза-упаковка

3. Мікророзподіл лікувальної назви

4. Навчальна назва зразка призначеного для випуску

5. Навчальна назва зразка призначеного для випуску

6. Медичне призначення

Сертифікат підтверджує, що медичний імунобіологічний препарат відповідає підходженням відповідно до нормативних вимог стандартів з апаратно-лікарського призначення в Україні до 09 грудня 2008 р.

Глава Державної служби лікарських засобів і засобів медичного призначення

М.П. Пасічник

Др. № 010907
Patents on Inventions
THANK YOU FOR YOUR ATTENTION!!!