Improvements in or connected with antitoxins / [Wolfgang Weichardt].

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Publication/Creation

Redhill : Printed for His Majesty's Stationery Office by Love & Malcomson, Ltd, 1904.

Persistent URL

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No 710 A.D. 1904

Date of Application, 11th Jan., 1904
Complete Specification Left, 1st Oct., 1904—Accepted, 15th Dec., 1904

PROVISIONAL SPECIFICATION.

Improvements in or connected with antitoxins.

I, WOLFGANG WEICHARDT, Doctor of Medicine, of 14 Lutherstrasse, Berlin Germany, do hereby declare the nature of this invention to be as follows:—

I have discovered, as a result of numerous experiments, that fatigue of the human or animal body is produced by certain toxin substances, which are hardly traceable in the normal (not fatigued) organism, but which are always found in the fatigued organism, and in considerable quantity.

These substances are saturated or rendered harmless by antitoxins produced in the organs of the body, when at rest, chiefly during normal sleep. In the blood, which is the vehicle of the anti-toxin, an appreciable quantity of toxins of fatigue is only found in cases of extreme fatigue.

My invention relates to the production of compounds or pharmaceutical preparations, which contain the antitoxins mentioned above and consequently have the effect, when introduced into the fatigued body or human organism, that the same recovers its normal condition in a comparatively short time, without requiring any sleep.

For this purpose muscular fatigue is induced in animals, preferably up to the commencement of yawning fits or spasms, after which they are bled to deprive the muscles of blood, the muscles are cut out, while taking rigid aseptic precautions, after which they are maintained at a temperature of about 37° C for several hours, then pounded in a sterilised mortar, then the muscle pulp thus obtained is pressed and relieved of superfluous liquid in a press, which has been previously sterilized. Suitable liquids, such as blood serum, or a physiological solution of table salt, may be added to and mixed with the muscle paste, before it is pressed. The plasma thus obtained is filtered through earthenware filters and injected into small animals, such as guinea pigs or mice, to test it as regards the quantity of toxins of fatigue contained in the plasma. If the quantity is found sufficient, the plasma is repeatedly injected to suitable animals, such as rabbits, goats and horses, for obtaining the anti-toxin.

After a short time the materials constituting the organs of the animals thus treated, especially the blood serum, which is comparatively rich in antitoxins adapted to rapidly neutralise or render harmless the toxins of fatigue, and is therefore capable of rapidly strengthening or animating an exhausted or fatigued body, are suitable for use in an appropriate form by introducing them into the alimentary circulation of the human body, for instance as an injecting liquid, or (because the antitoxins pass the stomach and intestines without decomposition) as an addition to enemas, or as an admixture to articles of food or stimulants, or in the shape of pills, tabloids or similar preparations.

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As mentioned before, the blood is the seat of the anti-toxins and normally possesses a certain quantity of anti-toxins which are capable of saturating the toxins of fatigue. Consequently my process may be modified by using blood serum or plasma obtained from unfatigued animals directly for neutralising or rendering harmless the toxins of fatigue, that is to say, by directly introducing such serum or plasma in a suitable form into the fatigued organism.

Dated this 11th day of January 1904.

FAIRFAX & WETTER
37 & 39 Essex Street, Strand, London,
Agents for the Applicant.

COMPLETE SPECIFICATION.

Improvements in or connected with anti-toxins.

I, WOLFGANG WEICHARDT, Doctor of Medicine, of 14, Lutherstrasse, Berlin, Germany, do hereby declare the nature of the said invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement :—

I have discovered, as a result of numerous experiments, that fatigue (as distinguished from exhaustion) of the human or animal body is produced by certain toxins, which are hardly traceable in the normal (not fatigued) organism, but which are always, and in considerable quantity, found in the fatigued organism. The said toxins are present in the plasm of the blood and in the milk, as well as in the muscles and other organs.

These substances are saturated or rendered harmless by anti-toxins produced in the organs of the body when at rest, chiefly during normal sleep.

My invention relates to the production of these toxins of fatigue and of their anti-toxins, the former being applicable for producing physiological conditions of sleep, while the anti-toxins are intended for removing conditions of relaxation and fatigue. For obtaining toxins, muscular fatigue is induced in animals, such as guinea-pigs, preferably up to the commencement of yawning fits or spasms, after which the said animals are bled to deprive the muscles of blood; muscles are cut out, after which they are preferably maintained at a temperature of 37° C for several hours and then pounded in a sterilised mortar. The muscle pulp thus obtained is relieved of superfluous liquid in a press, which has been previously sterilized. Suitable liquids, such as blood serum, or a physiological solution of table salt (a solution of about 0.8 parts of sodium chloride in 100 parts of distilled water) may be added to and mixed with the muscle pulp, before it is pressed.

The plasm thus obtained (viz: the liquid pressed out) contains in addition to the toxin of fatigue also numerous end products or waste products of normal physiological processes. It is first treated for several hours in a centrifugal machine for the removal of fat and similar matter, a portion of the albumen is precipitated out by known methods, and the remaining material dialised against distilled water in dialising pipes, thereby relieving it of the said end-products or waste material and of salts (which pass through the membrane, while the plasm remains behind). The organic plasm thus obtained therefore contains the toxin of fatigue. If desired, other organic plasm (viz: plasm obtained from other suitable organs), or blood plasm, or suitable excretions or secretions of the fatigued animals, such as their milk, may also be employed as raw materials for obtaining or separating the toxin of fatigue.

The toxin of fatigue or toxin material obtained as described may be condensed by known methods (for instance by boiling down in a vacuum), in order to obtain it in a concentrated form.

Weichardt's Improvements in or connected with Antitoxins.

For obtaining the anti-toxin, the toxin of fatigue is injected into suitable animals, such as rabbits, goats and horses. After a short time the tissues or materials constituting the organs of the animals thus treated and especially the blood serum (which is comparatively rich in anti-toxins adapted to rapidly neutralise or render harmless the toxins of fatigue, and is therefore capable of rapidly strengthening or animating an exhausted body) are suitable for use in an appropriate form by introducing them into the alimentary circulation of the human body, for instance as an injecting liquid, or (because the anti-toxins pass the stomach and intestines without decomposition) as an addition to enemas, or as an admixture to articles of food or stimulants, or in the shape of pills, tabloids or similar pharmaceutical preparations.

Milk and other secretions or excretions containing anti-toxin may also serve for the preparation of the same.

The process may be modified by bleeding unfatigued animals, preferably after sleep, when the blood contains a maximum of anti-toxins of fatigue, and obtaining serum from the said blood.

If it is desired to separate the anti-toxin of fatigue from the albuminous constituents of blood serum, that is to say, to obtain the anti-toxin in a condition of greatest purity and strength, it is subjected to dialysis. It has been found, that the anti-toxin of fatigue diffuses so readily through animal membranes, that the separation of the anti-toxins of fatigue from the undiffusable albuminous constituents of blood serum can be easily effected by dialysis. The details of procedure for this purpose are preferably as follows: The serum containing the anti-toxin is dialised against sterilised distilled water by means of aseptic pipes made of (vegetable) parchment paper or by means of aseptic bladders, and the dialysis is repeated as long as the serum yields anti-toxin of fatigue to the water, after which the water is evaporated in a vacuum.

In this manner an almost colourless product is obtained, which is soluble in water and consists mostly of anti-toxin of fatigue.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. The process for obtaining toxin of fatigue and the corresponding anti-toxin, which consists in causing intense fatigue in animals, thereby accumulating in their organism toxin of fatigue, separating the latter by the abstraction of blood or organic plasm or of suitable excretions or secretions, injecting the toxin or toxin material thus obtained into suitable animals, and subsequently abstracting blood or suitable excretions or secretions from the same, substantially as described.

2. The process for obtaining anti-toxin of fatigue, which consists in abstracting blood from unfatigued animals at a time, when the blood is rich in anti-toxin of fatigue and preparing serum from the same, substantially as described.

3. The separation of anti-toxin of fatigue from albuminous matter accompanying the same by dialysis, substantially as described.

4. As new articles of manufacture, the herein described toxin or toxin-materials or preparations and anti-toxin or anti-toxin materials or preparations, derived from the animal organism.

Dated this 1st day of October, 1904.

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Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1904.