schicht sind sie hingegen etwas angehäuft. Nach der Befruchtung, im Spermaster-Stadium, ordnen sich die Aschen radiär um den zentral gelegenen Kern. Eine starke Aschenansammlung findet sich an der Stelle der Spindel.

Urine Therapy

In 1927 I described[1] how recurrent herpes could be cured by vaccinating the contents of a mature vesicle into the skin of the fore-arm, a procedure not dissimilar to the small-pox vaccination. After an incubation period of a few days this auto-vaccination with the patients own (weakened) virus, is followed by a general feeling of discomfort and malaise which is often accompanied by a slight rise in temperature, pains in the limbs and sore throat. When these symptoms have subsided, the herpes does not recur at all, or only after a very long time. This therapy has since been used extensively and has proved its value[2].

Consequently, the discovery that hepatitis infectiosa is a virus disease transmitted by means of the excrements induced me to try autovirus therapy against this disease too, but using the urine of the patient for vaccination. The result of the trial was that the icterus disappeared, the enlarged liver which had been sensitive to pressure shrank and lost its sensitivity, the intestinal complaints improved, the general feebleness disappeared, the van der Bergh reaction of the urine diminished, and all the other symptoms of the hepatitis infectiosa subsided. These cures were observed whether the cases were acute or of long standing.

Following up this experience it was natural to attempt the treatment of other virus diseases with urine. Consequently I am now able to report that urine injections have a beneficial effect upon whooping-cough and mumps, though the number of cases so treated is as yet far too small to allow of a definite judgement as to the effects and efficiency of this method of treatment. The response of whooping-cough to the urine treatment led me to believe in the virus rather than in the bacterial origin of this disease.

In fact my recommendation to use the urine of the infected person for auto-vaccination is only en extension of the methods of JENNER and PASTEUR and therefore it is strange that auto-urine vaccination has not been used before. The main difference between the PASTEUR-JENNER methods and auto-urine therapy lies in the fact that by inoculating the fresh urine of the patient the active infectious material has been weakened by passage through the recipients own body. I am convinced from my experience that it is worth while investigating this method systematically with respect to all infectious diseases.

Morever, during the application of this therapy I observed some remarkable effects. Among my first patients whom I treated by the urine therapy there was a typical case of asthma. Immediately after the first injection and before the vaccination effect had time to develop, this patient lost his daily attacks of asthma. Following up this clue, I found that anaphylactic persons could be desensitized by the auto-urine injection. Subsequent investigations convinced me that the auto-urine therapy could be used with considerable advantage against all kinds of anaphylactic diseases, such as hay-fever, urticaria, disfunction of the intestinal tract such as cramps, meteorism, etc. It relieved migraines and other spastic conditions.

Since I started the auto-urine therapy two years ago I have given several hundred injections and I have not come across a single case where the patient suffered any harm. It is for this reason and because the method is so simple that it can be used by any practitioner without any difficulties, that I decided to publish my findings at this early stage. The observations which I have quoted are without doubt sufficient to indicate to the expert that a completely new field of research is being opened up which may entail considerable additions to our knowledge of bacteriology, immunology and serology. A first step in this direction will obviously be the examination from an immunological point of view of the substances secreted in the urine in the course of the various infectious diseases, in the same systematic manner in which the blood and other body fluids have been examined.

Practical considerations

The fresh urine of men is practically sterile, and that of women too if the exterior genitalia have been cleaned previously. For purposes of immediate injection the urine therefore may be collected directly into sterile vessels. If the urine is to be stored, it must be filtered through a fine grade bacterial filter by means of a suction pump. Since most of the active substances in the urine are unaffected by short boiling, the urine can be sterilized. There is evidence that some of the active substances such as those which affect anaphylaxis, are weakened by this treatment. The urine may also be made suitable for prolonged storage by addition of the usual disinfectants (Phenol etc.).

The application is very simple indeed. The most suitable method is intragluteal injection. When using urine as an auto-vaccine I found that usually one injection of a quarter to a half cm^3 of fresh urine is sufficient. In anaphylactic cases I have found it useful to start with 5 cm^3 of fresh urine and to repeat the injections with diminishing doses down to ½ cm^3 of fresh urine. After the first injection, the subsequent doses are not administered until the previous reaction has subsided i.e. at intervals of 3–7 days.

Effects of the urine injections

Almost without exception the first injections are completely painless but may be sometimes associated with a feeling of limping. After several injections an Arthus effect may develop. The point of injection may develop an interstitial inflammation and œdematous swelling. These local reactions usually disappear within 30 hours. Neither with fresh nor with preserved urine have I ever found purulence or necrosis.

On the other hand the general reaction of the organism may be of many different kinds. In most cases the patient does not suffer any undue distress. Now and then the temperature may rise to 100° F a few hours after the injection, but only for a brief period. Perhaps the most characteristic reaction to this therapy is the very intense psychological depression which has been commented on by many patients.

Generally speaking, there are many analogies between the effect of the urine injection on the human and the anaphylactic shock as observed in experimental animals. The effect on animals consists mainly of sneezing, tickling of the nose, restlessness, discharge of

[1] J. PLESCH, Die Bläschenerkrankung (Pusulosis), Z. klin. Med., *106* (1927).

[2] HRUSZEK, Derm. Z. *68*, 27 (1933); Brit. J. Dermat. and Syph. *46*, 296 (1934); Proc. R. S. M. *35* No. 1 (November 1941).

urine and fæces, respiratory distress, inspiratory asphyxia and bronchial spasms. If the shock is prolonged, the following symptoms can be observed in the animal: general lassitude, depression, lowering of the blood pressure and body temperature, reduction of the oxygen consumption following reduced metabolism, plethora of liver and abdominal organs. In all species the principal reaction consists of a contraction of the plain musculature and dilation of the capillaries. Usually the blood shows changes such as retardation of coagulation time, increase of the number of red cells, increase in the protein concentration and leucopenia.

Human beings after urine injections show all these symptoms to a greater or less degree. Sneezing fits, profuse secretion of mucous similar to coryza, coughing and sore throat sets in; dyspnœa, diarrhœa and vomiting are rare but do occur in varying degrees. The blood pressure may fall so that the pressure amplitude may be as much as 30 mm Hg and this is regularly accompanied by restlessness and slight dyspnœa. The body temperature may fall to 97° F. In almost all cases the blood count shows leucopenia and a moderate rise in the number of red blood corpuscles. I have so far not investigated the changes in the oxygen consumption, the coagulation of the blood, the functioning of the liver, etc., but after close clinical observation I have little doubt that we shall find conditions analogous to those observed in animals.

For obvious reasons, however, the observation of animals has failed to reveal what are in the human being perhaps the most characteristic consequences of urine injection, namely the psychological effect, the pains in the limbs and back and the sore throat. The depression sets in almost immediately after the injection, but the pains and the sore throat are not felt until several days afterwards. These symptoms usually disappear in a few hours, but may last for 24 hours. All these complaints may easily be brought under control by the administration of salicylates (Aspirin).

The onset, duration and intensity of the general reaction will be different according to which constituent of the urine is reacting. The interaction with viruses will have different consequences from that with bacteria and each will differ from the effects of reaction with the anaphylactogens, Within each of these groups there will be detailed variations according to the specific nature of the bodies involved. It is very unlikely that in any patient only one single interaction takes place. Therefore, it is almost impossible to predict exactly the nature and extent of the reaction which is to be expected.

The accumulated experience embodied in folk-medicine indicates that both own and alien urine may be effective not only by injection but also by external local application. For in folk-medicine urine has been used to treat diseases of the mucous membranes such as conjunctivitis, and skin diseases such as eczema since antiquity. The use of own urine as a traditional contraceptive suggests that urine injection may have been connected with a single case of abortion which I observed. The re-injection of excreted hormones may have caused this and hence caution is indicated in this respect.

J. PLESCH, *M. D.*

London, November 11, 1946.

Zusammenfassung

Es wurde gezeigt, daß die Injektion von Eigenurin wirksam ist gegen gewisse Viruskrankheiten. Es wurde auch festgestellt, daß dieselbe Behandlung desensibilisiert und gewisse anaphylaktische Störungen behebt.

DISPUTANDA

Differenzierung der Wirkung von Desinfizienzien *in vitro*, von W. Schuler[1]

Die Wirkung *suboptimaler* Konzentrationen von Desinfizienzien und von chemotherapeutischen Präparaten auf die Atmung von Bakterienkulturen habe ich bereits im Jahre 1942[2] beschrieben. Die Kurvenbilder, die bei der graphischen Darstellung der Atmungsgrößen erzielt werden, zeigen zwei verschiedene Typen, je nach dem es sich um suboptimale *bakterizide* oder *bakteriostatische* Effekte handelt; sie entsprechen dem «R-Typ» bzw. «S-Typ» SCHULERS.

1. Der «*Remissionstyp*»: Rivanol bewirkt mit abgestuften suboptimalen Dosen eine abgestufte partielle Abtötung von Kolikulturen, ohne daß die überlebenden Keime in ihrer Proliferation gestört werden. Das Kurvenbild der Atmungsgrößen (l. c. Fig. 3B) entspricht dem Kurvenbild unbehandelter Kolikulturen mit abgestuften Einsaaten (Fig. 3D): die Atmungskurven zeigen einen parallelen logarithmischen Anstieg. Der initiale Abfall der Atmungskurven, den SCHULER durch Zusatz im Bereich meßbarer Atmungsgrößen erzielt, bringt den partiellen bakteriziden Effekt direkt zur Darstellung. Das gleiche Kurvenbild des «R-Typs» habe ich mit einer anderen Versuchsanordnung produziert (l. c. Fig. 5).

2. Der «*Strahlungstyp*»: Substanzen mit einem bakteriostatischen Effekt, die — wie die Sulfonamide — nur in den Proliferationsprozeß eingreifen, verursachen mit suboptimalen Dosen eine abgestufte Herabsetzung der Vermehrungsgeschwindigkeit. Das «strahlenförmige» Kurvenbild der Atmungsgrößen (l. c. Fig. 3A) entspricht dem Kurvenbild unbehandelter Kulturen, die bei abgestuften Temperaturen gezüchtet werden (Fig. 3C). Die Absterbekurven, die in dem Beispiel des «Strahlentyps» von SCHULER mit der 2- und 4fachen Dosis von Phenylquecksilberborat erzielt werden, zeigen lediglich einen partiellen bakteriziden Effekt dieser höheren Dosen an, denn die Absterbekurven gehen nach der 4. Stunde ebenfalls in die Horizontale über.

Am Beispiel des Sublimats hat FILDES[3] bereits gezeigt, daß Hg-Präparate, die als allgemeine Zellgifte bakterizid wirken, mit minimalen Dosen spezifisch in den Proliferationsprozeß eingreifen können, indem sie schwefelhaltige «Metaboliten» der Plasmasynthese blokkieren. IVANOVICS[4] hat einen zweifachen antibakteriellen Wirkungsmodus bei der Salizylsäure nachgewiesen. Bemerkenswert ist die Beobachtung SCHULERS, daß ein und dasselbe Präparat gegen zwei verschiedene Erreger nach dem «R-Typ», d. h. bakterizid, oder nach dem «S-Typ», d. h. bakteriostatisch, wirken kann.

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[1] Exper. *2*, 316 (1946).

[2] J. HIRSCH, Studien über die mikrobiologischen Grundlagen der Sulfonamidtherapie. C. r. de la Soc. turque Sci. phys. et nat. *10*, 1; Istanbul 1942, Kenan Basimevi.

[3] P. FILDES, The Mechanism of the Anti-Bacterial Action of Mercury. Brit. J. exp. Pathol. *21*, 67 (1940).

[4] G. IVANOVICS, Der antiseptische Wirkungsmechanismus verschiedener Benzolderivate, mit besonderer Rücksicht auf die spezifische Salizylatwirkung. Z. f. Immunitätsforschung *102*, 238 (1943).