

BIOLOGICALS VIEWED AS PHARMACEUTICALS.*

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The prominent rôle which biologicals are playing in both prevention and treatment of disease calls for a consideration of them from every angle that will add to the pharmacist's understanding of these agents.

While pharmacists are accustomed to grouping medicinal substances into such classes as crude drugs, chemicals, galenicals, biologicals, etc., as items of *materia medica*, biologicals can scarcely be looked upon as other than pharmaceuticals, especially since it is the province of pharmacy to provide and dispense all medicinal substances.

In the course of the day's work, it is customary for the pharmacist to think of the substances which he handles in terms of composition, a practice which makes it advantageous to have a mental picture of the composite nature of biologicals as well as of the other materials that are dispensed.

Now while dispensing pharmacists are familiar with the conversion of crude drugs and chemicals into galenicals and other finished preparations it is their commonly accepted practice to purchase biological products, and to sell them without occasion to as much as see the contents of the packages, seldom or never having need to combine them with other substances. Accordingly, pharmacists have but little or no opportunity to become familiar with the composition of biologicals.

Indeed the two antitoxins and smallpox vaccine which are official in the U. S. P. X are described and otherwise dealt with by this authority as finished products only, thus implying as in the case of the chemical substances that biologicals will likely be made by laboratories which specialize in the production of such materials.

While biologicals may be regarded apart from galenicals and other groupings of *materia medica*, just as the galenicals are so generally considered as the finished preparation of the given active agent which they contain, biologicals also have this definite aspect of a pharmaceutical nature.

According to the proximate or composite nature of the galenicals, it is customary to group them, as is done by the *Pharmacopœia* and *National Formulary*, into the well-known classes recognized by these authorities. Now that same thought may be applied to a recognition of the comparatively simple nature of the diluent or bulk of any biological preparation, thus looking at the biologicals from the standpoint of formula or composition, that is from their pharmaceutical nature.

To know the biologicals from the standpoint that shows this character affords an understanding of them which is of practical value in discussing these items with physician and public; and in these days when fiction is featuring the facts of immunology it is well to be prepared to describe biologicals.

Again biologicals like other pharmaceutical preparations are designed for certain purposes and like the latter have limitations as to suitability for application as well as of serviceability for effect; hence, in the source or nature of the essential

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constituent or in the method of use will be found the reason that governs the make-up or composition of these preparations, just as there is reason for selection of solvent or other variation in the formula of a galenical.

The official descriptions of diphtheria and tetanus antitoxins and of small-pox vaccine specify the solvents or diluents to be used in these preparations, and it is a matter of practical knowledge to note that these same few liquids (glycerin, water, or water and salt) are those in practically every other biological which the pharmacist dispenses.

This acquaintance with biologicals as finished preparations brings them well within the scope of true pharmaceuticals, and it will be noted that the well-known glycerite, solution, etc., are the classes of preparations under which biologicals may be grouped.

While some biologicals are transparent solutions, most of them are translucent suspensions of matter which is only slightly, if at all, soluble in the diluent, some biologicals being on that account designated as emulsions or suspensions.

Following the foregoing thoughts, if smallpox vaccine is followed through its process of production the pharmacist will be inclined to look upon it as a glycerite, for the reason that when the serum-moist vaccine material is removed from the calf it is ground with glycerin and the resulting mixture filtered to remove all solid particles. It will be recalled that some years ago smallpox vaccine was referred to as glycerinized lymph.

Koch's Old Tuberculin, the tuberculin most generally employed, is pharmaceutically a glycerite as the method of production will show. For test purposes and for administration as treatment, this tuberculin is diluted with physiological salt solution. Other forms of tuberculin are suspensions or emulsions in physiological salt solution with or without the presence of other substances which have been used in the medium on which the tubercule bacillus was grown.

Since most biologicals are used by injection into the tissues (usually under the skin, but sometimes into muscle, nerve, blood or spinal fluid) attention is paid to having the diluent miscible with and otherwise appropriate for contact with the fluid of these tissues. This requirement is met by use of physiological salt solution, also known as normal saline, for conveying the essential biological agent. The reason for using this vehicle will be gathered from the following paragraph which is quoted from one of the dispensaries.

"When pure water is brought in contact with the blood it causes alteration in the red blood corpuscles, allowing the escape of hemoglobin from them into the plasma; this is known as laking of the blood. The addition of inorganic salts to the water, in quantities sufficient to make a solution of the same osmotic tension as the blood serum, prevents this action on the corpuscles. When a solution contains just the amount of salt necessary to prevent laking it is said to be isotonic with the blood. Because of its non-toxicity sodium chloride is the salt usually employed for the purpose of preparing an isotonic solution. The amount of salt necessary for this purpose varies in different animals; in the human being it requires an 0.9 per cent solution of sodium chloride, but an 0.6 per cent is isotonic with ox blood. This isotonic solution is sometimes spoken of as normal salt solution, an unfortunate term, as it is likely to be confused with the normal solution of sodium chloride used by chemists, which is nearly seven times stronger. A much better term is the official name, physiological salt solution."

Numerous slight modifications of this fluid are made by adding certain other salts which are constituents of the blood serum besides the sodium chloride, but,

for the reason given, it is always desirable to preserve the important feature of isotonicity.

The extent to which physiological salt solution is used as the diluting or suspending vehicle, as well as an indication of its wide range of serviceability, becomes apparent in the fact that the following well-known biologicals are prepared with it—antitoxins, bacterins or bacterial vaccines, serobacterins or sensitized bacterial vaccines, pneumococcus antibody solution, toxins for detecting susceptibility and for active immunization, diphtheria toxin-antitoxin, rabies vaccine, protein solutions for testing and for desensitizing purposes including hay fever pollen extracts.

Normal horse serum and the unconcentrated serums (all of which are the filtered serums of the horse's blood) may properly be regarded as solution of their respective active constituents in physiological salt solution.

Besides being used in smallpox vaccine and old tuberculin, as already mentioned, glycerin is used in some forms of rabies vaccine, in Schick test toxin and in the glycerosaline pollen extracts.

To lengthen the preservation of biologicals, the authoritative standards permit the addition of from 0.25 to 0.5% of cresol or phenol to most of the biologicals. In some products, glycerin is used as a preservative.

As regards the answers to the many questions on other matters pertaining to biologicals, it will be a very exceptional occasion when the pharmacist and physician together will not be able to find the answer in the package or through their reasoning together.



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