Title	Studies on the intravenous administration of fat emulsion prepared by high pressure jet
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Citation	The Review of Physical Chemistry of Japan (1952), 22(2): 83-83
Issue Date	1952-12-25
URL	http://hdl.handle.net/2433/46686
Right	
Type	Departmental Bulletin Paper
Textversion	publisher

STUDIES ON THE INTRAVENOUS ADMINISTRATION OF FAT EMULSION PREPARED BY HIGH PRESSURE JET

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At present, a study is being made to a certain degree in relation to the water contents, carbohydrate, amino acid, vitamine, and also salts as a remedy for the parenteral nutriment. There is, however, few study concerning the fat, which is the principal source of calorie.

We have conducted this study from 1945. But, in truth, in order to avoid the fat-emboly by intravenous administration of fat emulsion, it is always necessary to make the fat globule smaller than erythrocyte, because the fat globule in the blood or thoracic duct lymph is of the size of $1 \sim 2\mu$. Therefore, it is ideal for us to inject fat emulsion in the size of less than 2μ into veins. Accordingly, we have endeavored to manufacture an emulsion comprising of fat globules less than 2μ in diameter.

We had planned and manufactured with our own hands, by the apparatus[1) 2)] in the Physico-Chemical Laboratory, College of Science (Kyoto University), of producing a fat emulsion by high pressures, with which we had succeeded in manufacturing a fat emulsion that is fit for intravenous administration, and could report a part of the experiment for the first time at the 50th annual meeting of the Japan Surgical Society (1949). And ever since, we are inquiring into the effect of this emulsion in vivo.

Our emulsion at present contains 15 ~20% cod-liver oil. The rate of composition the said fatty-substance, as shown in Table 1, is mostly neutral fat, containing grape sugar at the rate of 4%. The size of fat globules is less than 2μ and pH is nearly neutral. Also, it can withstand the disinfection by the application of heat at 100°C, for 30 minutes. The emulsion thus prepared is put in a sterilized vacuum bottle and is being stored.

Table 1

Neutral fat	Free fatty acid	Lecithin
85.5 %	7.9 %	6.4 %

From the result[3) 4)] of our experiments on animals, we assert that our emulsion can be fully utilized even if it is intravenously administered, and it can also be fully utilized from the viewpoint of nutrition, and in the point of fat metabolism, we think that we have clearly demonstrated that the lung is playing an important role. Moreover, in future, we intend to continue the study for exploitation of this emulsion, based on the result of our experiments on animals, in the direction of clinical application.

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1) *This Journal*, **21**, 82 (1951)
2) *This Journal*, **22**, 46 (1952)
3) *Journal of the Japanese Surgical Society*, 52, No. 6, 7; 9 (1951)
4) *Journal of the Japanese Surgical Society*, 53, No. 6; 12 (1952)