

## One Hundred Years of Heparin

Gargantilla P<sup>1,2\*</sup>, Arroyo N<sup>1</sup> and Pintor E<sup>2</sup>

<sup>1</sup>Department of Internal Medicine, Hospital de El Escorial, Madrid, Spain

<sup>2</sup>European University of Madrid, Spain

\*Corresponding author: Pedro Gargantilla, Department of Internal Medicine, Hospital de El Escorial, Madrid, Ctra. Guadarrama-Escorial Km 6,255, 28200 El Escorial, Madrid, Spain, Tel: +34 918 97 30 00; E-mail: [pgargantilla@yahoo.es](mailto:pgargantilla@yahoo.es)

Rec date: Dec 23, 2015, Acc date: Dec 29, 2015, Pub date: Dec 31, 2015

Copyright: © 2015 Gargantilla P, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

### Opinion

This year is the 100th anniversary of the discovery of heparin, the main anticoagulant drugs for more than 70 years [1], and we would like to remind its discovery. Heparin is a highly-sulfated glycosaminoglycan. It was first discovered by J McLean and WH Howell. McLean was a second-year medical student, at Johns Hopkins University, who was assisting Howell in the investigation of pro-coagulant preparations. Howell suggested to him that he study the nature of the thromboplastic substance to identify the active principle of this extract. In 1916 the young student isolated a fat-soluble anticoagulant in canine liver tissue [2]. It was discovered *serendipitously* in the course of a problem.

However, McLean had to leave college in 1917 because of lack of money. A year later Howell and his alumni LE Holt developed another fat soluble anticoagulant apparently distinct and they called "heparin" -

from Ancient Greek "hepar" (liver) [3]. Many years later he presented further refinements to that protocol (1926) and the final result was a compound different from anticoagulant isolated by McLean (1916) and by Howell (1918). In the 1920 Best started the clinical development of unfractionated heparin, extracting it from beef liver and showing that it was a source of best dog liver heparin. It has taken 20 years from the discovery of heparin to its therapeutic use (1935), the first human trials of heparin were conducted.

### References

1. McLEAN J (1959) The discovery of heparin. *Circulation* 19: 75-78.
2. Wardrop D, Keeling D (2008) The story of the discovery of heparin and warfarin. *Br J Haematol* 141: 757-763.
3. Marcum JA (2000) The origin of the dispute over the discovery of heparin. *J Hist Med Allied Sci* 55: 37-66.