

# Interactive 3D encyclopedia for the teaching of pharmacology to medical students



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## Background

The growing number of available medications and ongoing advances in knowledge around pharmacodynamics (PD), pharmacokinetics (PK), and interactions in the molecular and genomic field, make pharmacology a science of continuous growth. Thereby, its teaching represent a challenge for both students and teachers, who are always in search for motivation and long lasting learning. The number of publications listed in Medline as “pharmacology teaching” has been increasing since 1998 (figure 1). One way to approach this challenge is by interactive learning. Interactive software has been designed to help students during this process, some are available on Internet and others are on CDs.

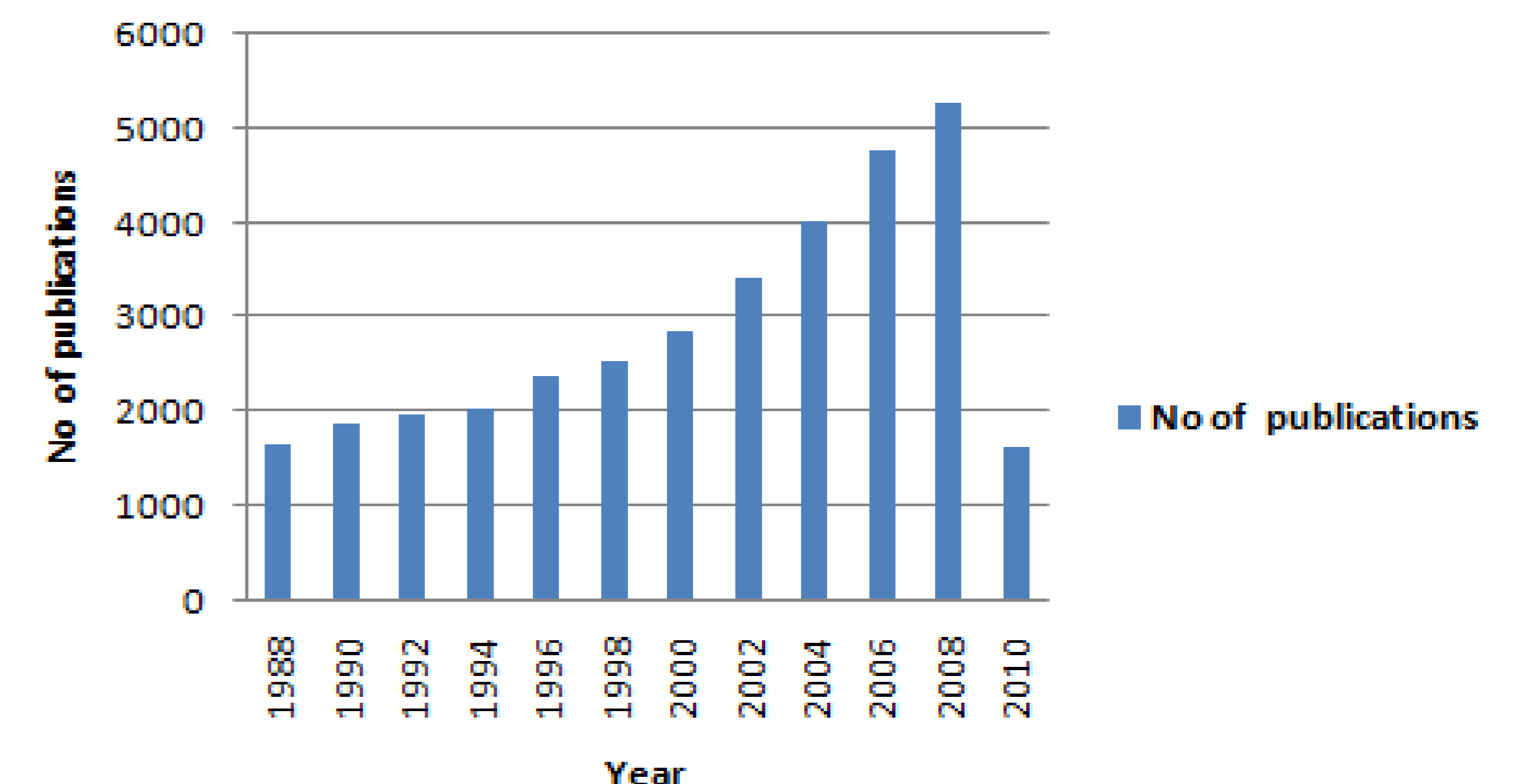
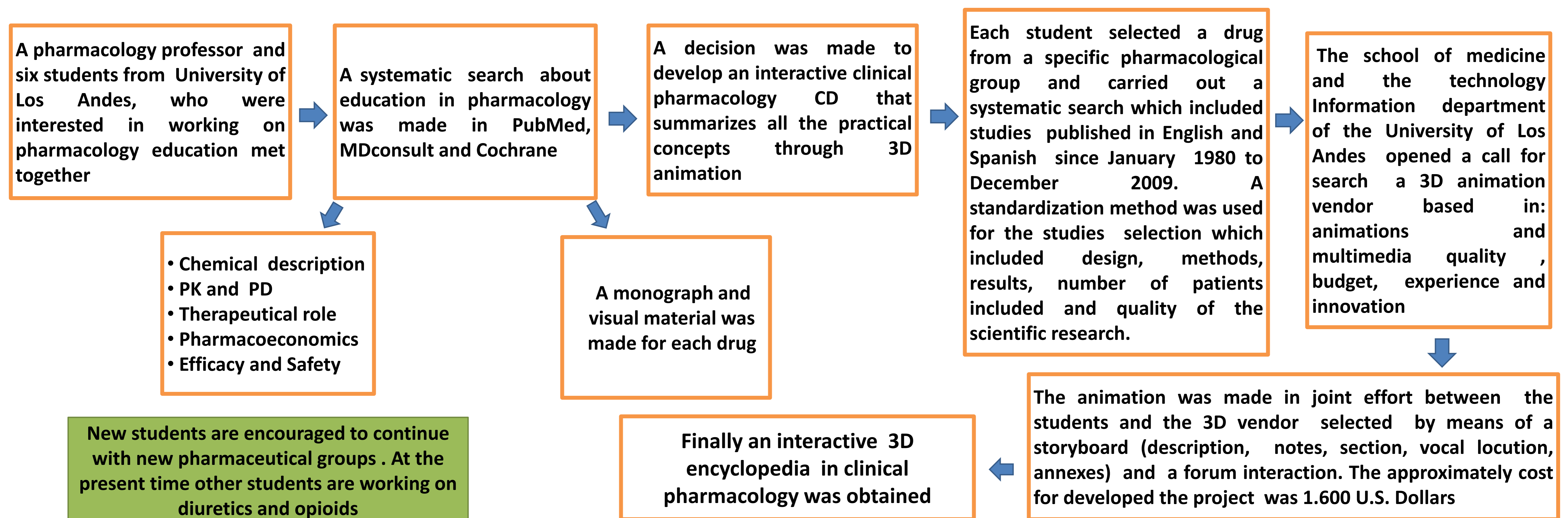


Figure 1. Number of publications listed in Medline under the key word “pharmacology teaching” from 1998 /01/01 to 2010/05/12.

## Objective

To develop the first interactive 3D encyclopedia (in Spanish and English) for the twenty-nine essential medicines included in the World Health Organization (1), where principles of PD, PK, efficacy, safety, pharmacoconomics, drug interactions and posology can be found. Currently the first group that is under development are anticoagulants. Anti-thrombotic therapy is one of the most used treatments worldwide. Each year around 300.000 people in the United States die only from pulmonary embolism (2). As a result, appropriate teaching on anticoagulants should be reinforced as much as possible in order to guaranty a suitable therapy for patients. This argument was strong enough to convince us to go through anticoagulants first.

## Methodology



## Results

During August and December of 2009 monographs and visual materials has been done for anticoagulants and from December 2009 to August 2010 the library is expected to be completed (figure 2). Diuretics and opioids are being developing by senior medical students in the same way. We estimate to develop four therapeutical classes each year and our plan is to finish the encyclopedia by 2016.

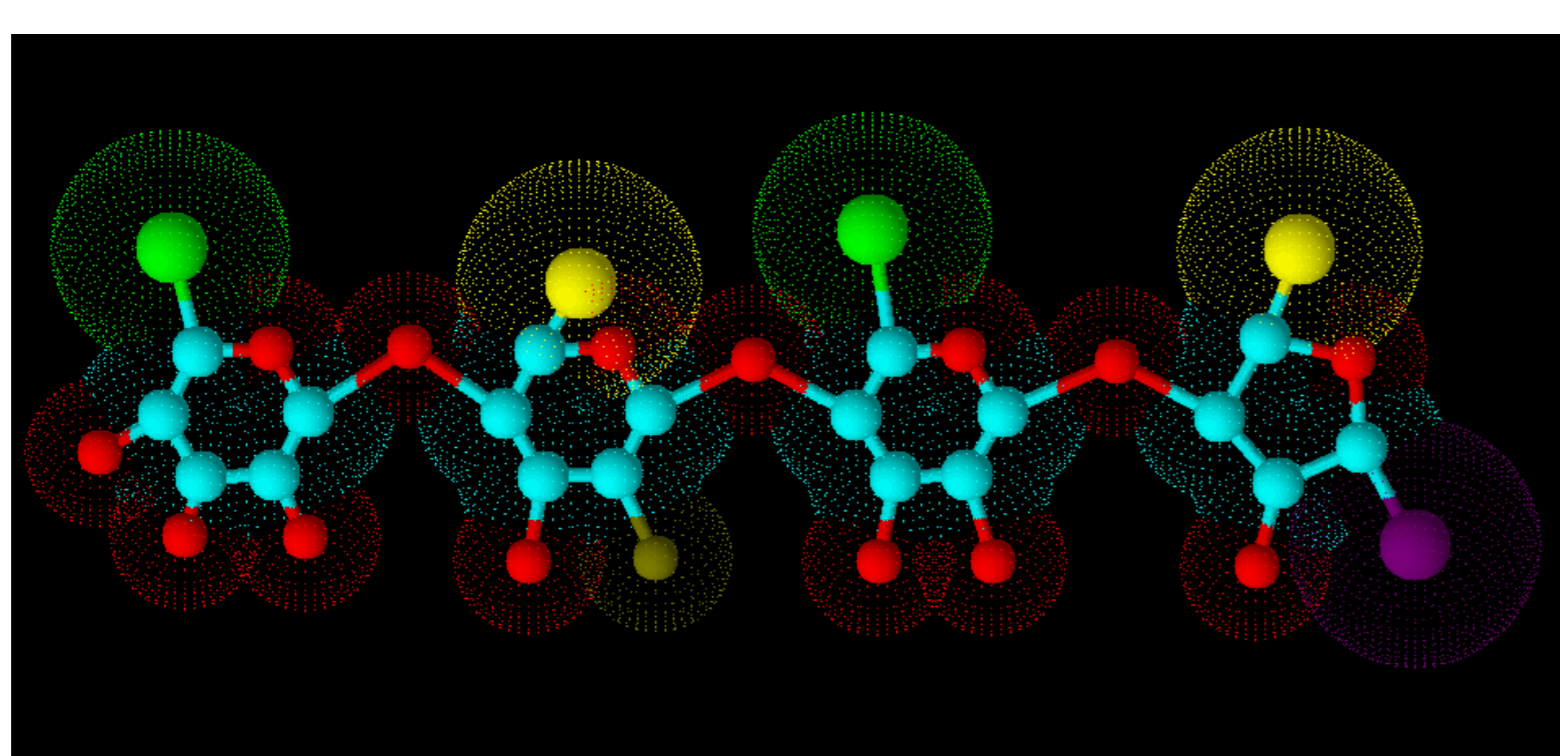


Figure 2. Nadroparin Calcium. Molecular 3D structure.

## Conclusions

Education in pharmacology has its limitations because of the lack of available teaching material that facilitates understanding. The use of technological tools and the condensation of information in an interactive way will allow students a better understanding in pharmacology as well as educational tools for teachers.

## Acknowledgments

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## References

1. The World Health Organization. WHO Model List of Essential Medicines. Update March 2010. <http://www.who.int/medicines/publications/essentialmedicines/en/index.html>
2. Tapson VF. Acute pulmonary embolism. *N Engl J Med.* 2008;358: 1037–1052.