

## Rapport d'évaluation du mémoire de thèse / Evaluation report of the PhD thesis

<b>Doctorant</b>	Nom prénom / Full name	CORUCCI GIACOMO
<b>PhD student</b>	Ecole Doctorale / Doctoral School	PHYS - PHYSIQUE
	Titre thèse / PhD Title	Analysis of the Factors Regulating the Activity of the
	PLA1-1 isoform: A Neutron Reflectivity and Mass-Spectrometric study	
<b>Rapporteur</b>	Nom prénom / Full name	GERELLI YURI
<b>Reviewer</b>	Etablissement / Institution	INSTITUTE FOR COMPLEX SYSTEMS - CNR
	Statut, fonction / Status, position	ASSISTANT PROFESSOR

### Qualité du mémoire : structuration, rédaction & illustrations / Thesis quality, style & illustrations


(A titre indicatif/For information : Exceptionnel = top 5%, Très bon/very good = top 25 %)

 Insatisfaisant / Unsatisfactory ☐
                     Satisfaisant / Satisfactory ☐
                     Bon / Good ☐
  
 Très bon / Very good ☒
                     Exceptionnel ☐

#### Commentaires/comments :

The manuscript is well organised and this facilitates reading despite its length. The topics are correctly introduced and the language used is scientifically sound. The figures are very clear. However, in some of them the reference to the original source is missing. The only identifiable problem from the point of view of methodology in the writing is the lack of accuracy of some sections (e.g. about the techniques used) in which general concepts are mixed in with the particular cases encountered by the student in his thesis work and, as a result, do not convey the general significance attributed to them. ]

### Contexte/ collaborations, background : état de l'art / state of the art :

 Insatisfaisant / Unsatisfactory ☐
                     Satisfaisant / Satisfactory ☐
                     Bon / Good ☐
  
 Très bon / Very good ☐
                     Exceptionnel ☒


#### Commentaires/comments :

The state of the art and the scientific background are described in detail and taking into account the work published by other authors over the past 20-30 years on the subject. The information in the thesis is completely comprehensive and enables the reader to understand the subject without any difficulties or gaps.

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### Qualité scientifique : méthodologie, expérimentations, validation

#### Scientific quality, methodology, experiments, validation

 Insatisfaisant / Unsatisfactory ☐
                     Satisfaisant / Satisfactory ☐
                     Bon / Good ☐
  
 Très bon / Very good ☐
                     Exceptionnel ☒

#### Commentaires/comments :

The series of experiments, analysis and data interpretation described in the manuscript are an excellent example of how a PhD thesis work should be conducted. The candidate developed and followed the project in each step, from the production of the molecules to be used, their purification and characterisation, the development of protocols for bilayer formation and the experiments on hydrolysis. The combination of technique used allowed the candidate to investigate the degradation process from an analytical point of view as well as from a structural side, elucidating the changes taking place in a phospholipid membrane upon

release of degraded material. The preparatory work described in the manuscript is also very important because it elucidates some "still debated" points on membrane biophysics. Finally, the candidate developed some new software application tailored for the analysis of the systems of interest that could be further expanded to more general cases. The only remark is about the incorrect use of significant figures in the representation of the experimental uncertainty in some parts of the text and tables (e.g. Table 3.2).

#### **Apports personnels : originalité, valorisation, perspectives**

**Personal contributions : originality, exploitation and application of results, prospects.**

⇒ Insatisfaisant / Unsatisfactory ☐      Satisfaisant / Satisfactory ☐      Bon / Good ☐  
Très bon / Very good ☐      Exceptionnel ☒

#### *Commentaires/comments :*

The manuscript contains, in several sections, clear original contributions from the candidate. The methods used to conduct experiments and for their analysis have been clearly tailored on the samples investigated to extract the maximum information from data analysis. Routine experiments are only a minor part of the work presented. For some of the subjects addressed in the manuscript, a conclusion could not be reached in the thesis and the candidate offers, in all cases, a clear outlook on future perspectives or on already ongoing additional investigations.


#### **Conclusions du rapporteur / Reviewer's conclusions**

##### *Commentaires/comments :*

Mr. Corucci presents within the manuscript remarkable scientific advances concerning the mechanisms of action of PLA enzymes, obtained through the use of advanced techniques such as neutron reflectometry and mass spectrometry. In addition, he describes in a very comprehensive way how such molecules (PLAs and phospholipid) could be produced, purified, and utilised. The details used to describe the steps and procedures used and developed demonstrate that the candidate has extensive knowledge and experience of experimental and analytical work. The results presented are undoubtedly novel in the field of membrane biophysics and biochemistry. I would like to emphasize the comprehensive interdisciplinary character of the research project covering the research fields of biomolecular expression, structure prediction, scattering techniques and data analysis. In my opinion, the thesis by Giacomo Corucci fulfils all requirements for obtaining the PhD degree.

#### **Avis du rapporteur / Reviewer's opinion :**

Défavorable à la soutenance / Unfavorable to the defence ☐      Favorable ☒

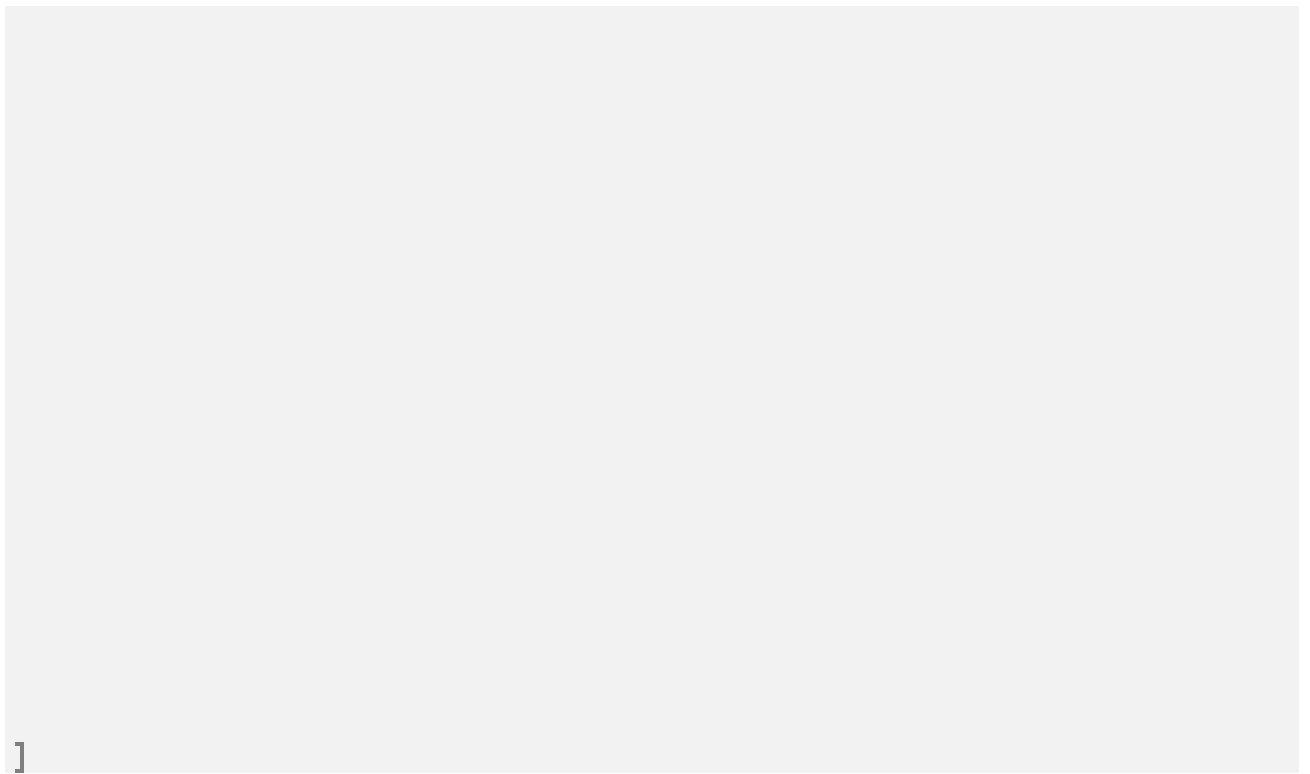
Date [ 12-02-2023 ]      Signature [  ]

#### **Visa du directeur de l'école doctorale :**

#### **Rapport détaillé, commentaires libres, questionnements**

**Detailed report, free comments, questions**

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