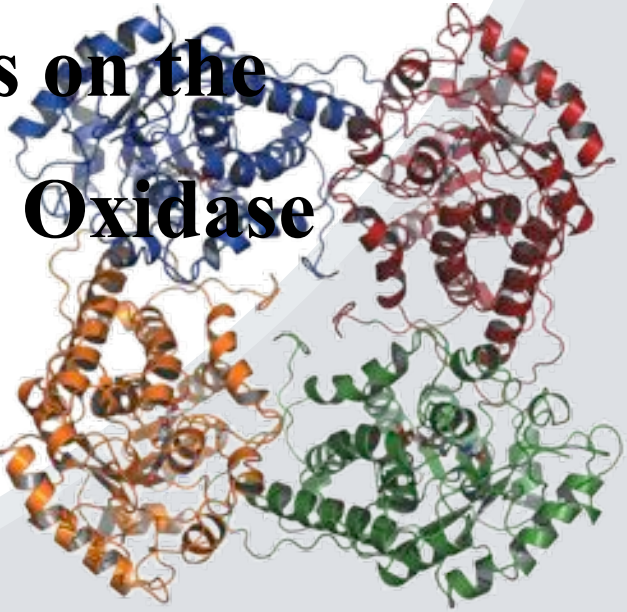
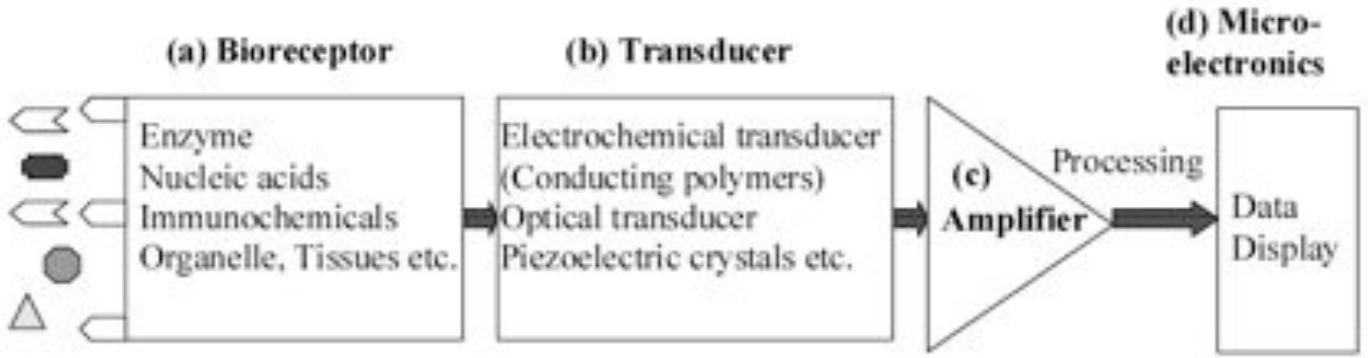
Ionic Liquids in biosensors: influence of hydrated choline based ILs on the bio-functionality of Lactate Oxidase

Vincenzo F. Curto



Electrochemical and wearable biosensors

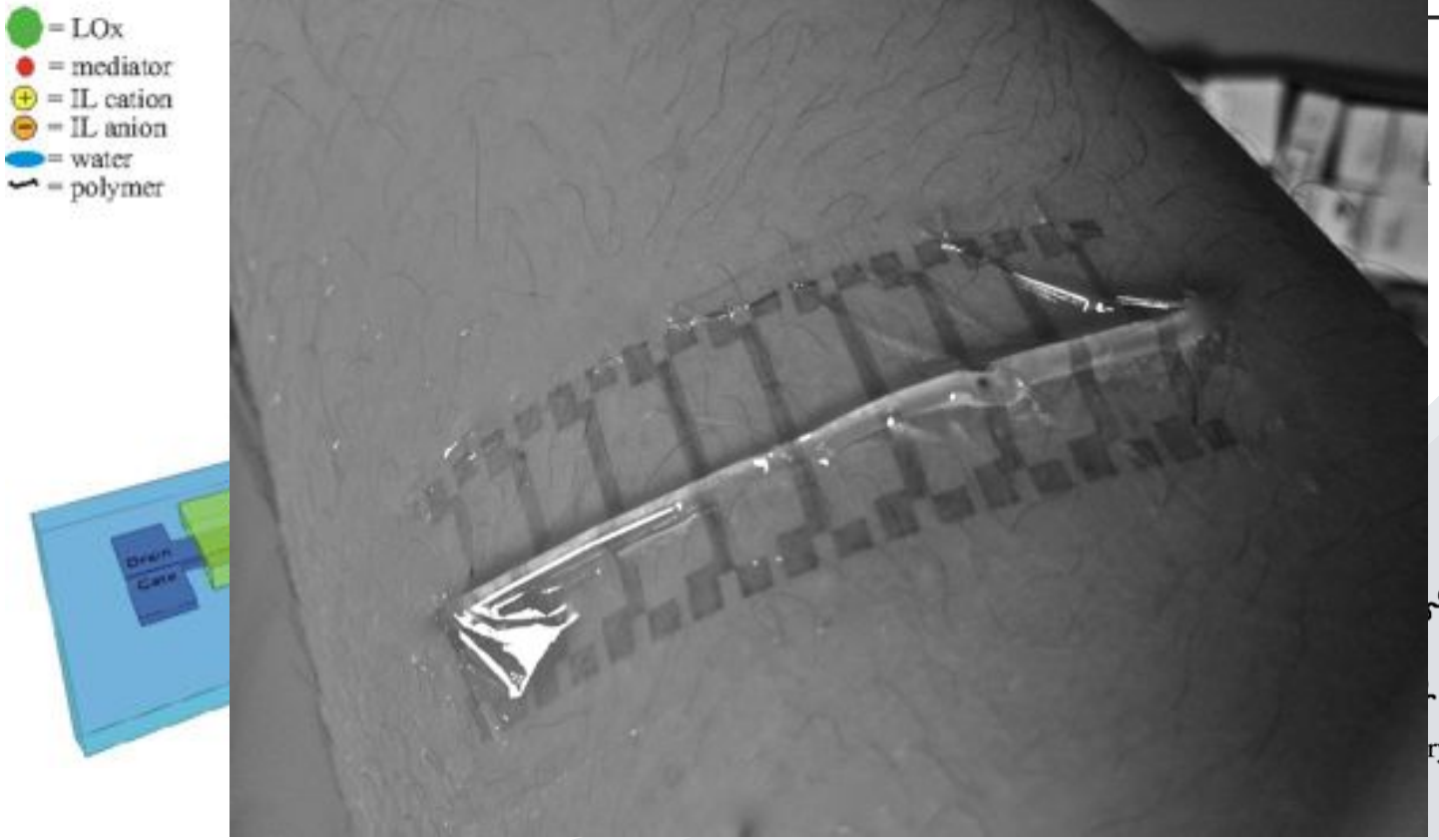


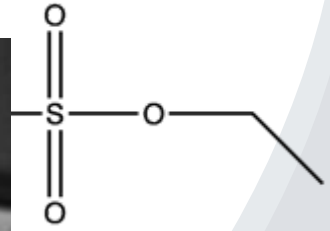
Wearable sensors allow the continuous monitoring of a person's physiology in a natural setting

Long-life bioreceptor issues

- ✓ narrow pH range activity
- ✓ temperature range stability
- ✓ limitations that are associated with the use of conventional aqueous electrolytes

Ionogel & OECTs: Lactate Sensor





sulfate $[EtSO_4]^-$

rylamide)

V. F. Curto, et al., J. Mater. Chem., 22, 4440 (2012).

Choline based ILs

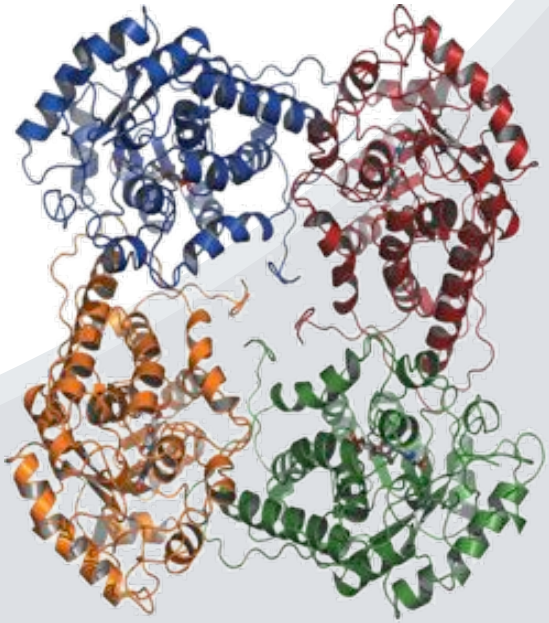
1. ***Choline aminoacetate***
2. ***Choline dhp***
3. ***Choline levulinate***
4. ***Choline bis(2-ethylhexyl)phosphate (BEH)***
5. ***Choline formate***
6. ***Choline tartrate***
7. ***Choline gallate***
8. ***Choline dibutylphosphate***
9. ***Choline valporate***
10. ***Choline nitrate***
11. ***Choline chloride***

Enzyme: *Lactate Oxidase (LOx)*

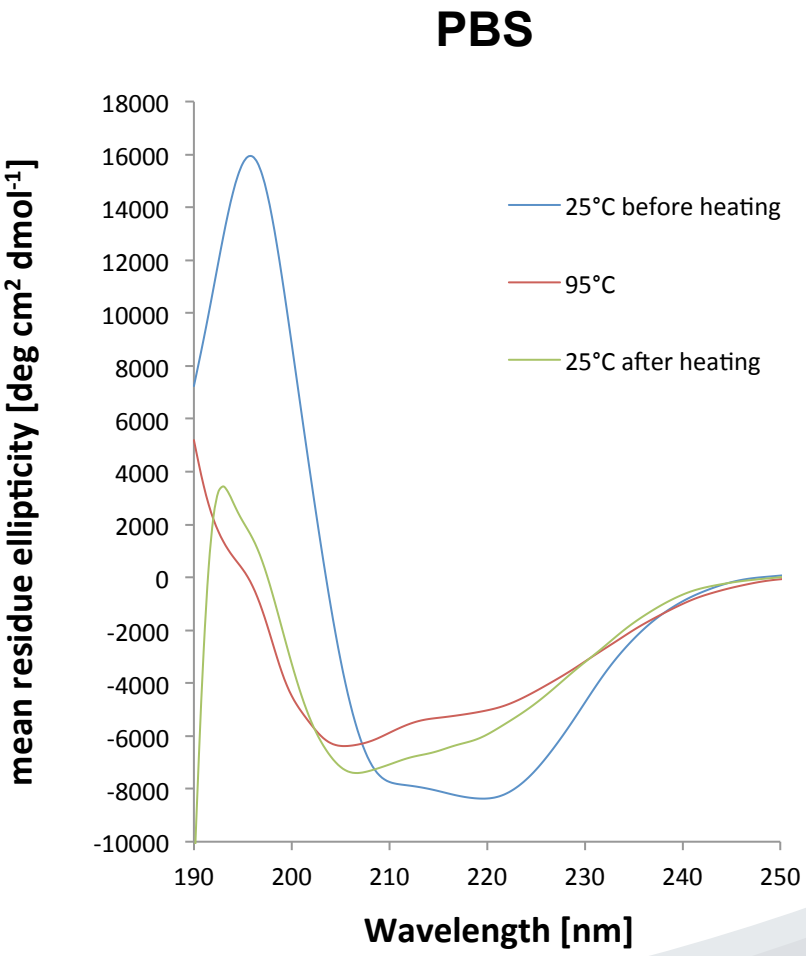
from *Aerococcus Viridans*

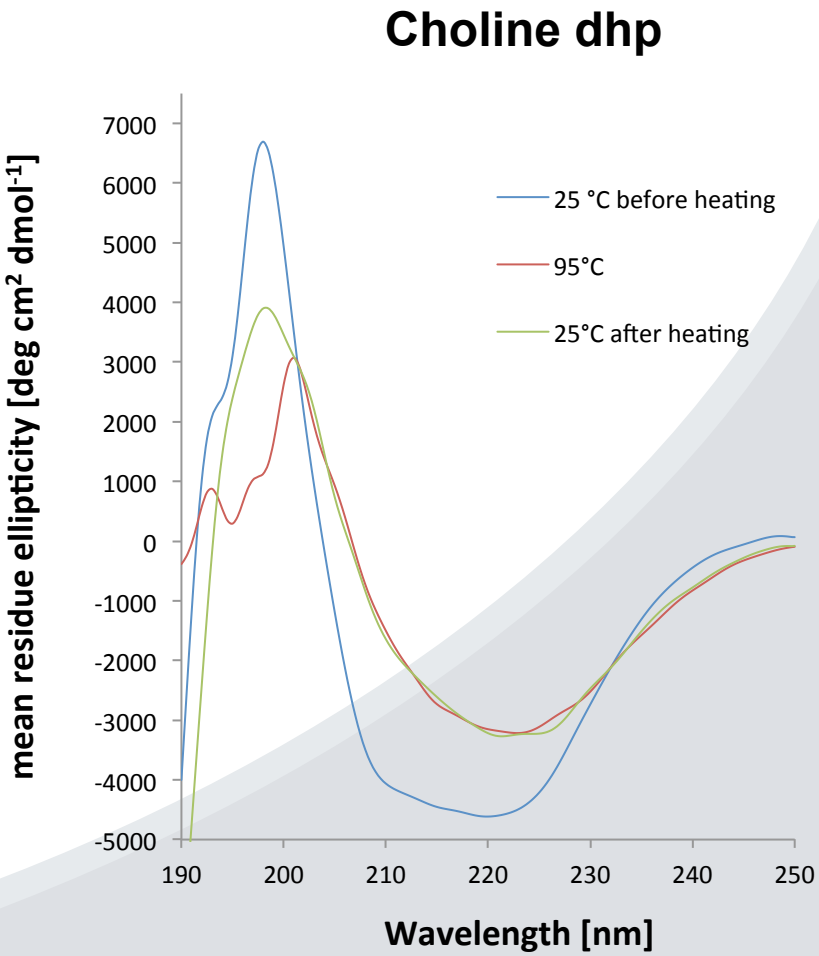
– α-hydroxy-acid oxidase flavoenzyme family

– Molecular Weight: 80 kDa

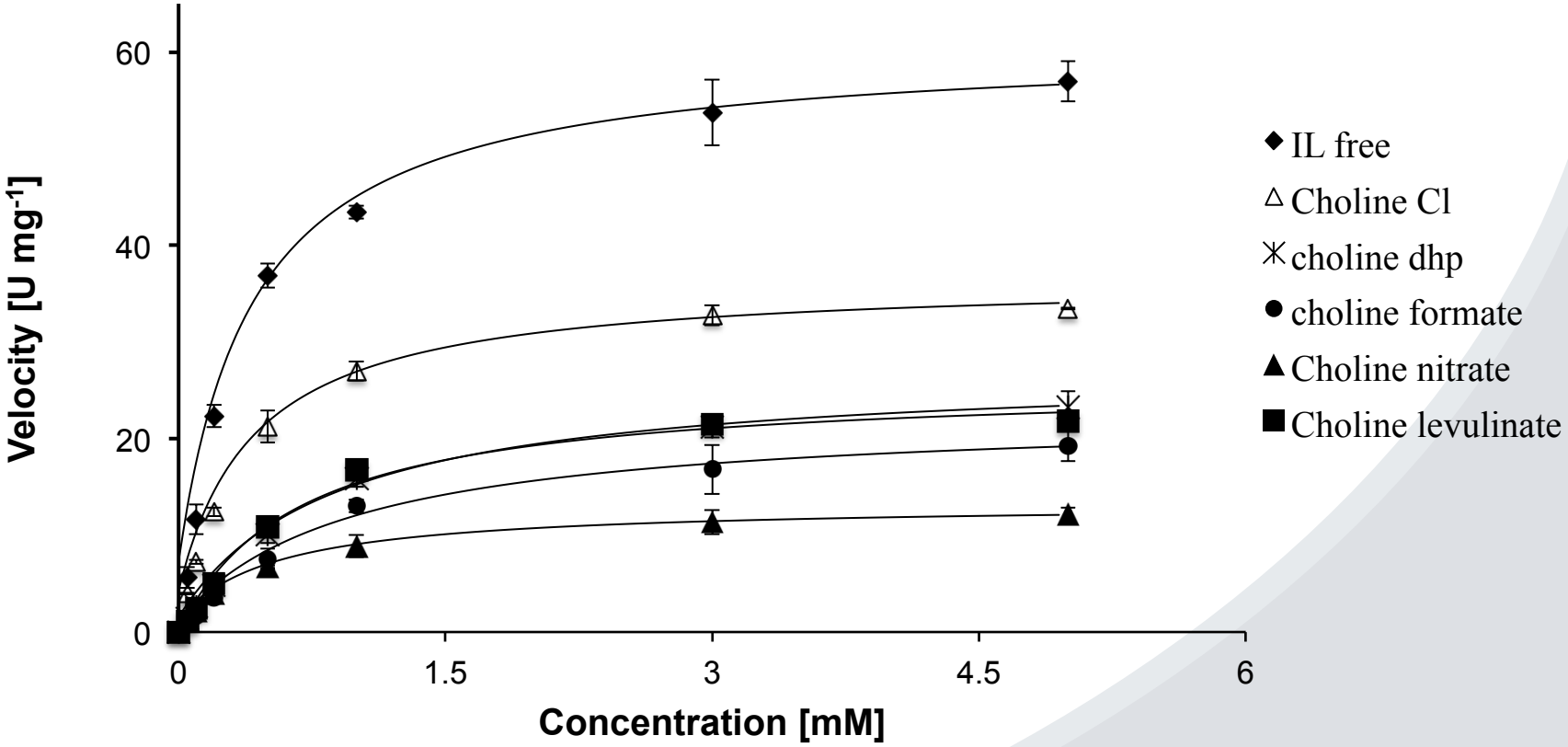


Enzyme structure - Cirlcular Dichroism



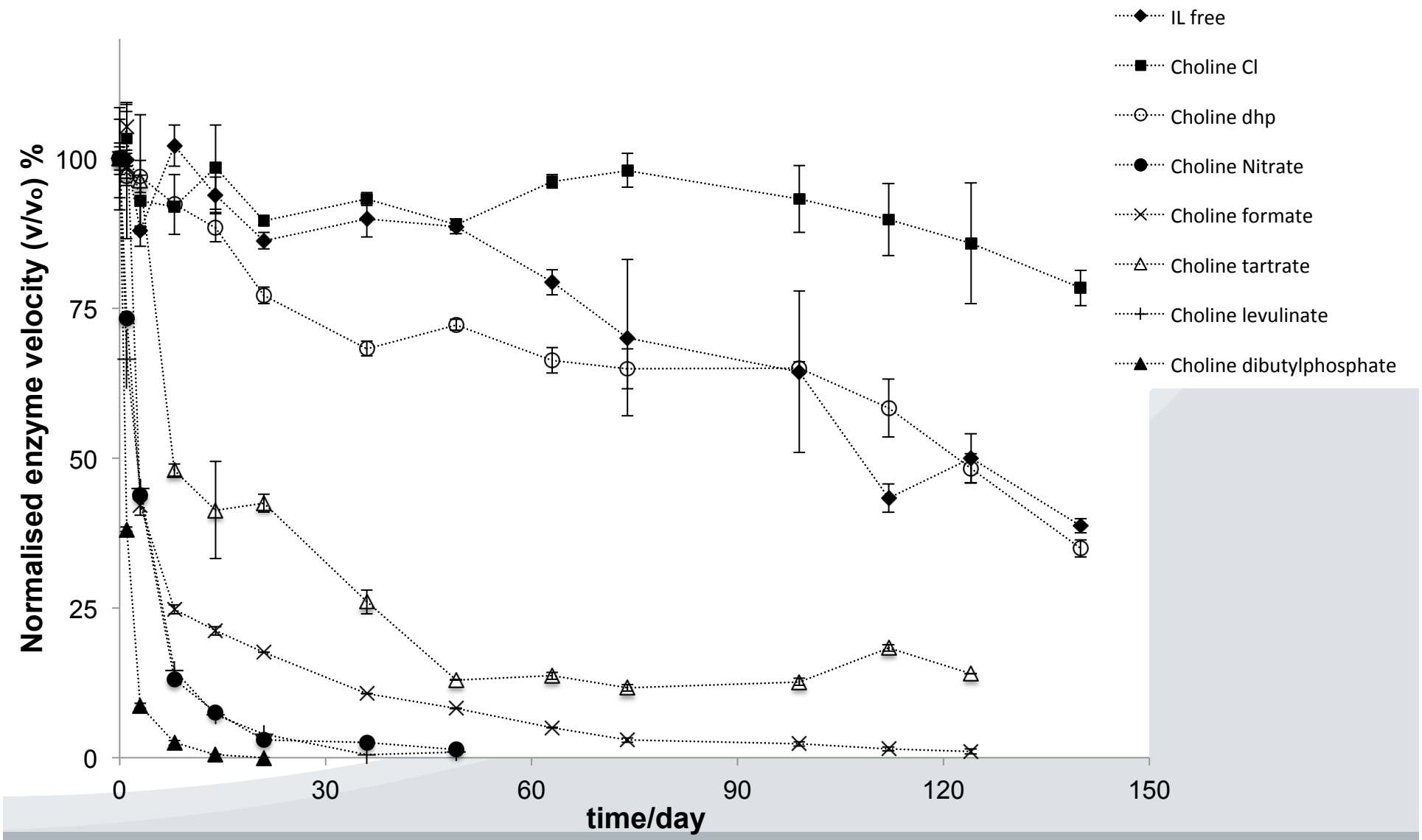


Enzyme Kinetic



	K_m [mM]		K_m [mM]
IL free	0.366	**Choline formate**	0.926
Choline Cl	0.377	**Choline nitrate**	0.487
Choline dhp	0.825	**Choline levulinate**	0.674

Long Term stability – T= 5 °C



Acknowledgements

CLARITY
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Ecole Nationale Supérieure des Mines SAINT-ETIENNE

Department of Bioelectronics
Microelectronics Center of Provence
www.emse.fr

Dr. Dion Khodagholy

Prof. Róisín Owens

Prof. George Malliaras

NCSR
National Centre for Sensor Research

Dr. Fernando Benito-Lopez

Prof. Dermot Diamond

MONASH University

Dr. Vijay Ranganathan

Prof. Doug MacFarlane

sfi
science foundation ireland
fondúireacht eolaíochta éireann

DCU
Dublin City University
Ollscoil Chathair Bhaile Átha Cliath

07/CE/I1147

Research Career Start Programme 2010