

# Centros de Apoyo a la Investigación

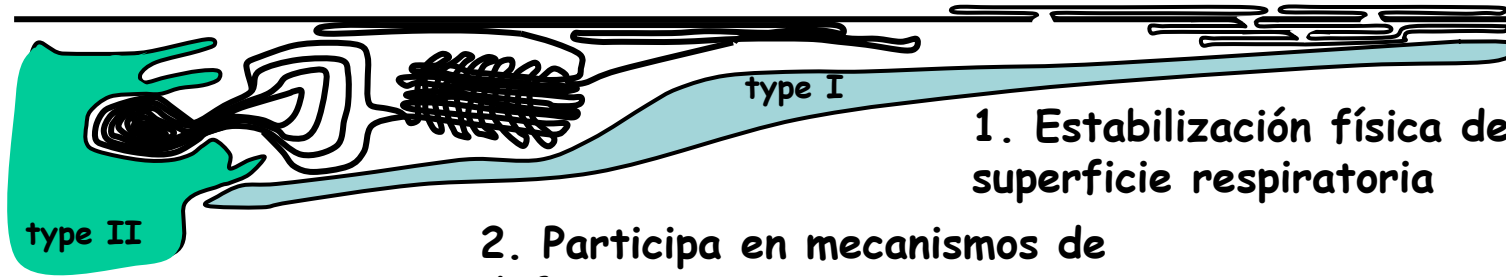
J o r n a d a d e D i f u s i ó n

Jesús Pérez Gil

## Estructura de complejos proteína/membrana en el sistema surfactante pulmonar

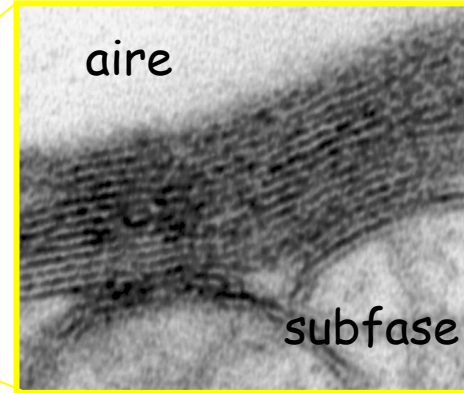
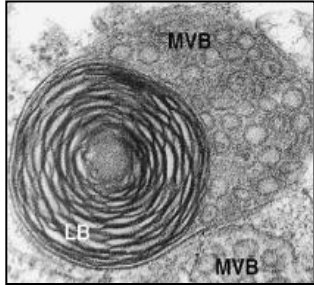
(una investigación CAI-dependiente)

# SURFACTANTE PULMONAR



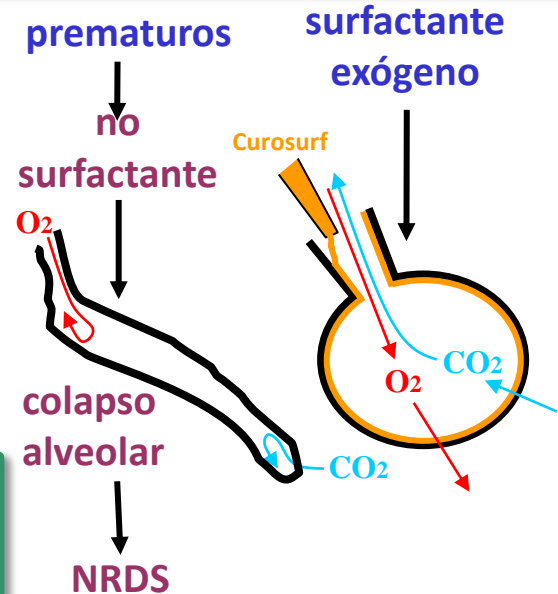
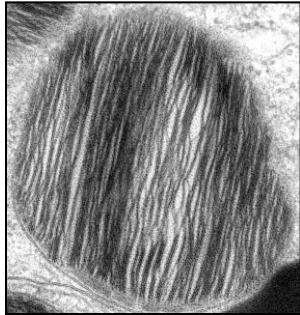
1. Estabilización física de la superficie respiratoria

2. Participa en mecanismos de defensa innata



película interfacial tensioactiva

cuerpos lamelares

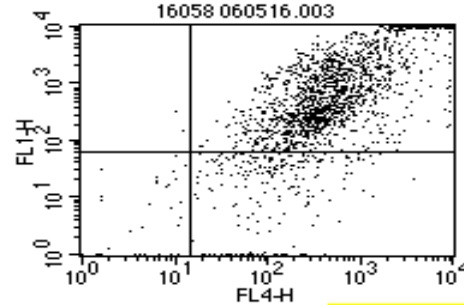


**INVESTIGACIÓN**  
Fundamental: ¿cómo se ensambla? ¿cómo funciona?  
Proyección: producción de mejores surfactantes terapéuticos

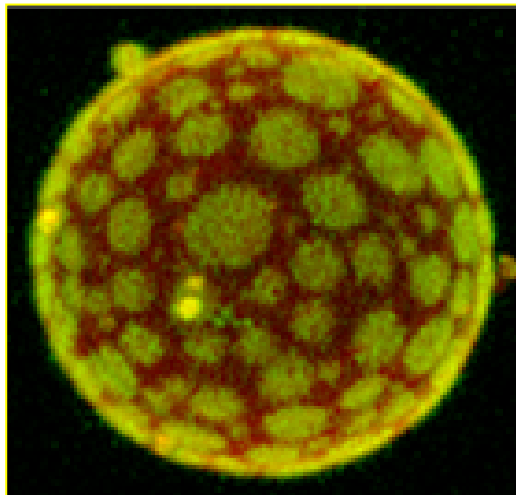
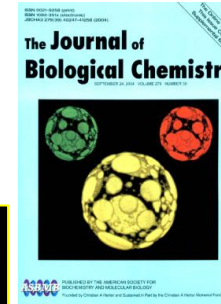
# SURFACTANTE PULMONAR

Análisis del efecto de proteínas/fármacos  
sobre poblaciones de vesículas

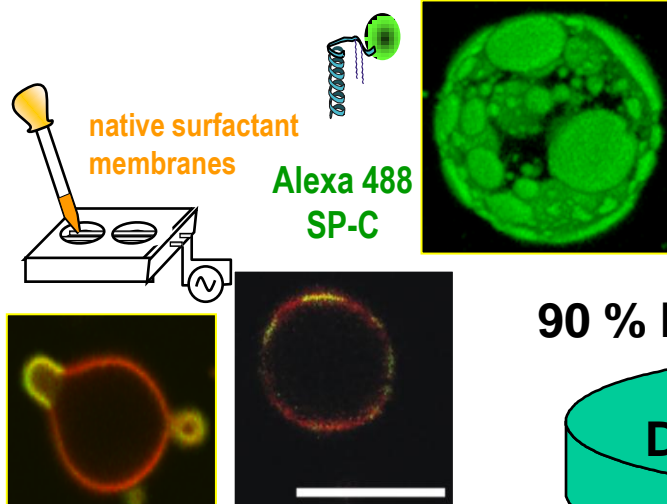
**C.A.I.**  
Citometría y  
microscopía de fluorescencia  
microscopía de  
fluorescencia confocal



B. de la Serna et al. (2004), JBC 279, 40715  
B. de la Serna et al. (2009) Biophys J 97, 1381  
E. Lopez-Rodriguez et al. (2013) JBC 288, 29872

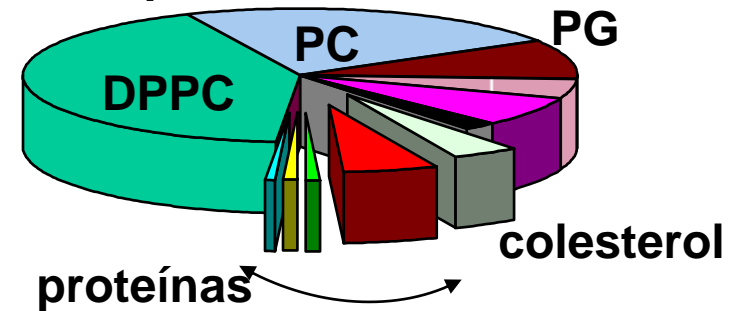


estructura heterogénea de las membranas del surfactante

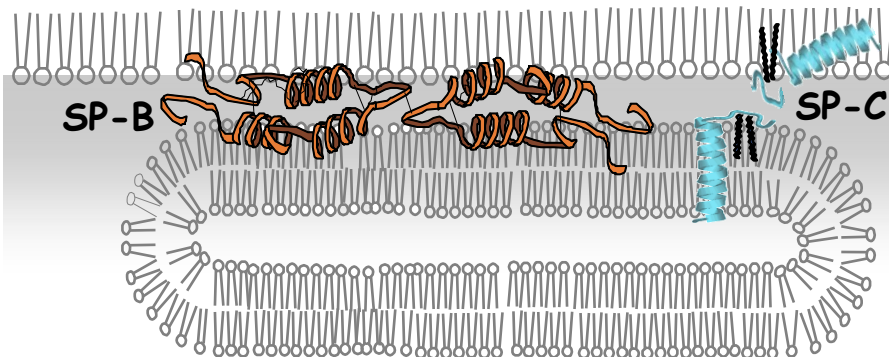


distribución preferencial de las proteínas

90 % lípidos



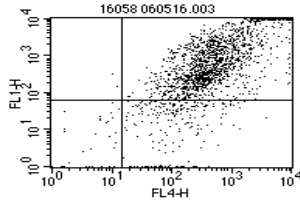
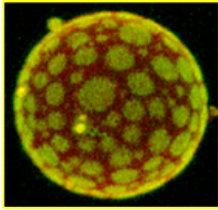
- 6% SP-A
- 1% SP-B
- 1% SP-C
- < 0.5% SP-D



# SURFACTANTE PULMONAR

**C.A.I.**

**Citometría y microscopía de fluorescencia**



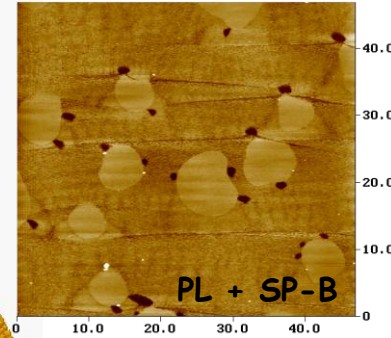
estructura submicroscópica de membranas y películas interfaciales

**Microscopía de fuerzas atómicas (AFM)**

Lukovic et al., (2012) Langmuir 28, 7811

Blanco et al. (2012) BBA 1818, 2756

Suri et al. (2013), BBA 1828, 1707



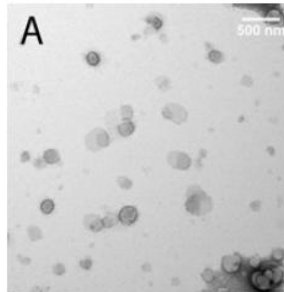
**I.C.T.S.**

**Centro Nacional de Microscopía**

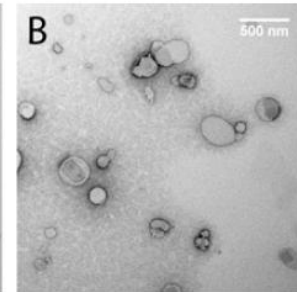
estructura de membranas y complejos lipoproteicos  
**Microscopía Electrónica (tinción negativa)**

Parra et al. (2011), Biochem J 438, 555

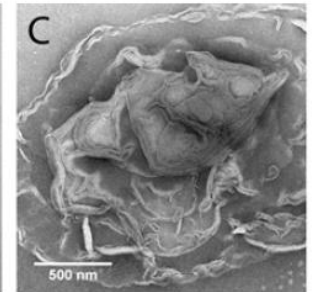
B. De la Serna et al. (2013) Faraday Disc. 161, 535



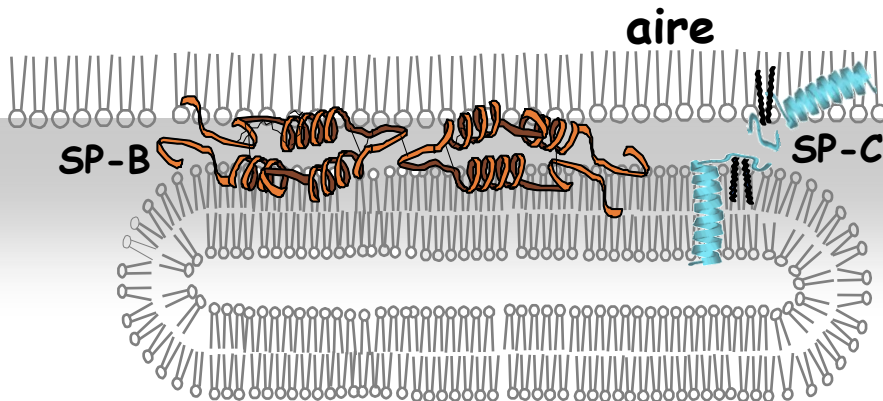
POPC vesicles (100 nm)



POPC vesicles +SP-B/C



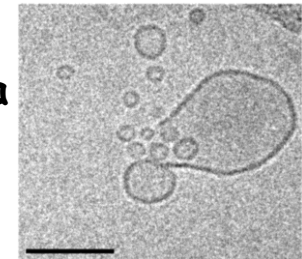
POPC vesicles +SP-B



**Criomicroscopía Electrónica**

**Microscopía Electrónica C.I.B. - C.S.I.C.**

Roldan et al. (2016), Biophys J 111, 1703

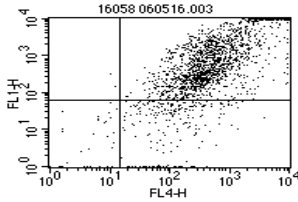
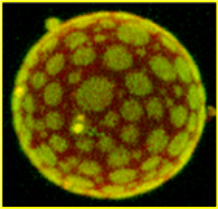


POPC vesicles +SP-C

# SURFACTANTE PULMONAR

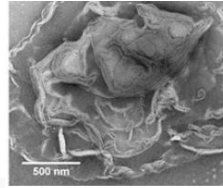
C.A.I.

Citometría y microscopía de fluorescencia

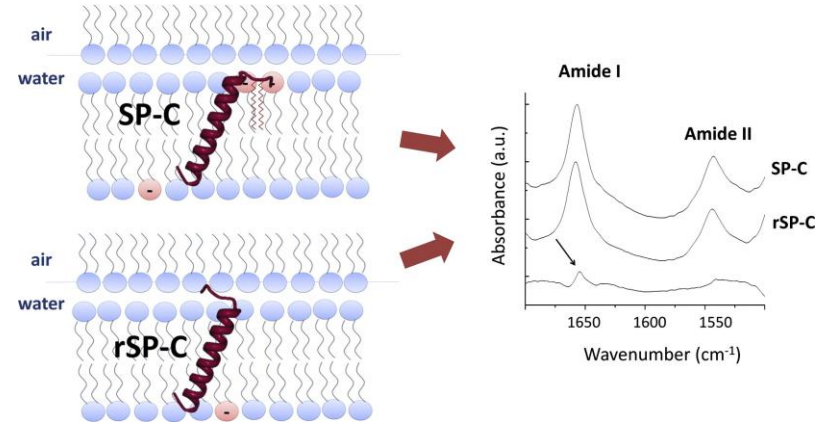
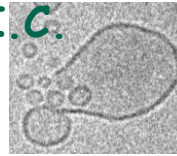


I.C.T.S.

Centro Nacional de Microscopía



Microscopía  
C.I.B. - C.S.I.C.

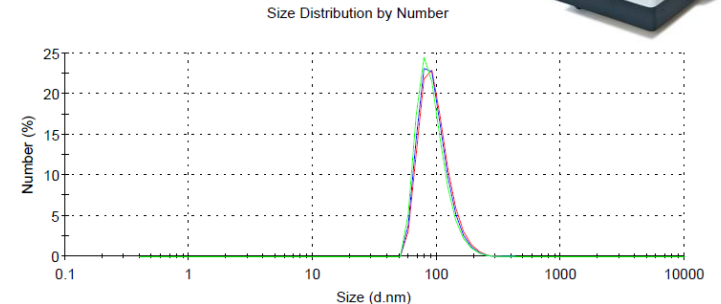
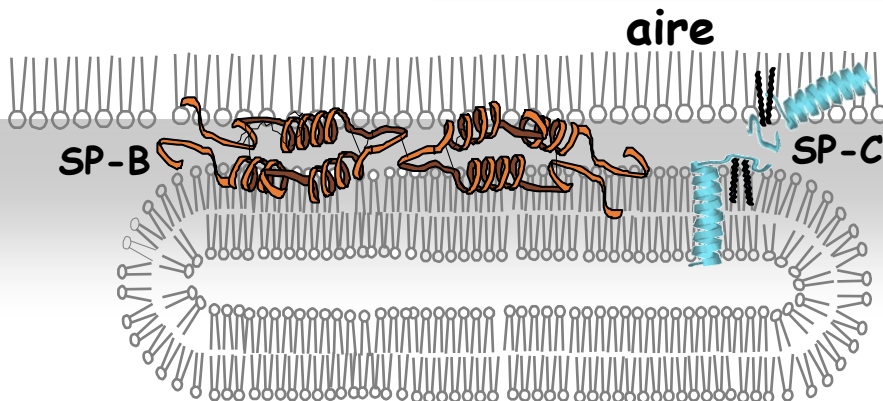


Estructura y orientación de proteínas en membranas  
Espectroscopía infrarroja (FTIR y ATR)

C.A.I.

Espectroscopía y Correlación

tamaño y polidispersión de partículas  
Dispersión de luz dinámica (DLS)

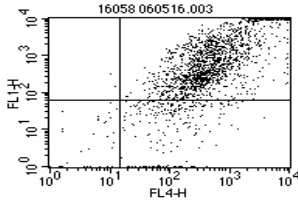
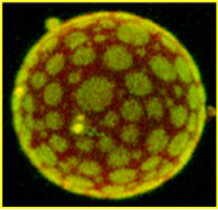


Record 255: 230614 DPPCPOPCPOPG 100-2 1  
Record 256: 230614 DPPCPOPCPOPG 100-2 2  
Record 257: 230614 DPPCPOPCPOPG 100-2 3

# SURFACTANTE PULMONAR

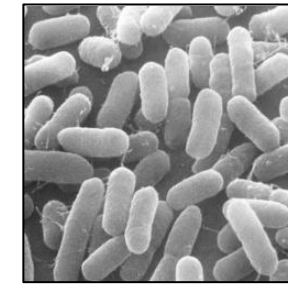
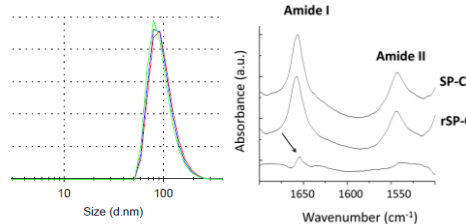
**C.A.I.**

**Citometría y microscopía de fluorescencia**



**C.A.I.**

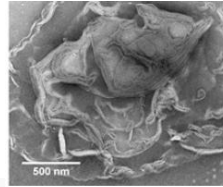
**Espectroscopía y Correlación**



**E. coli**

**I.C.T.S.**

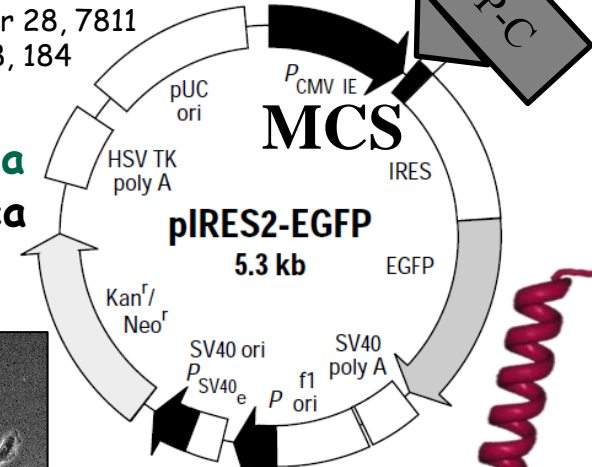
**Centro Nacional de Microscopía**



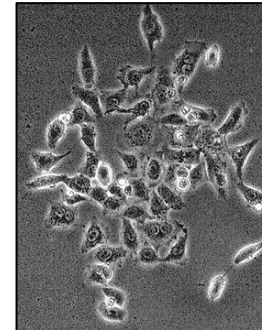
**Microscopía  
C.I.B. - C.S.I.C.**

**C.A.I.**  
**Genómica y Proteómica**  
**Secuenciación genómica**

Lukovic et al., (2012) Langmuir 28, 7811  
Roldan et al. (2015) BBA 1848, 184

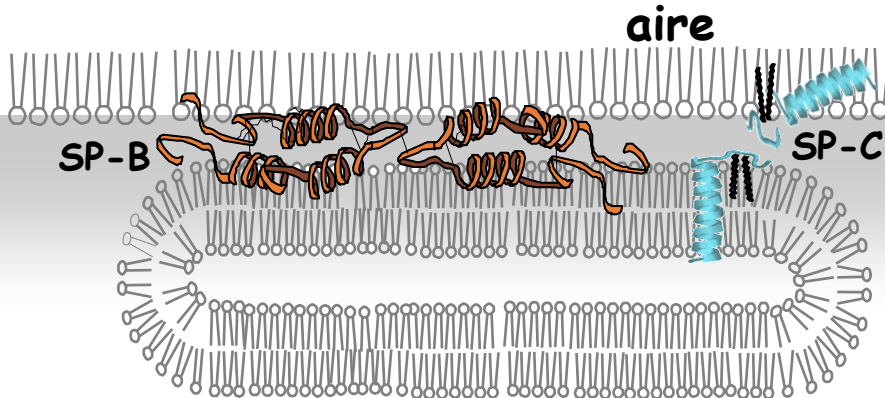
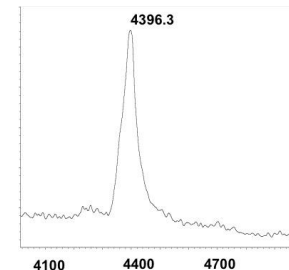


**SP-C humana recombinante**

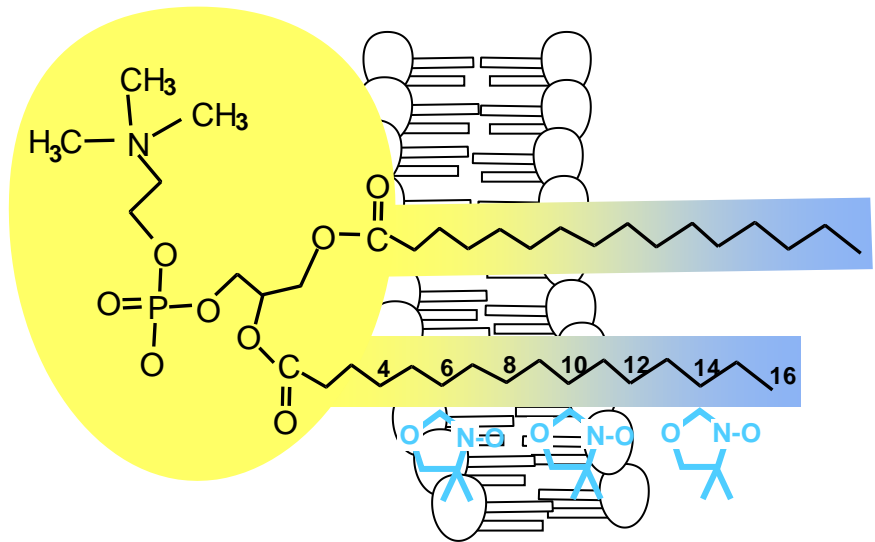


**Células HEK293  
(riñón humano)**

**Espectrometría de masas MALDI-TOF**



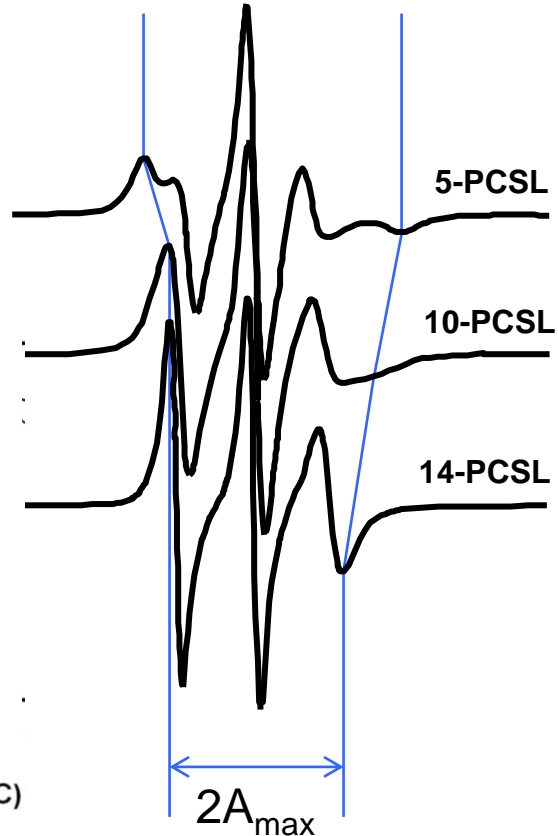
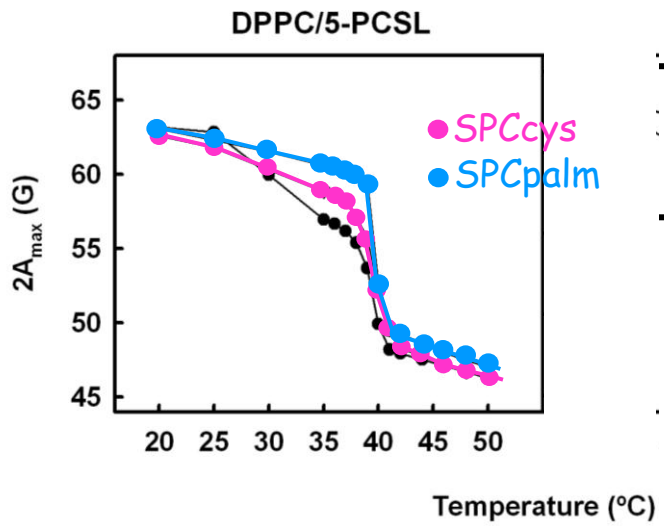
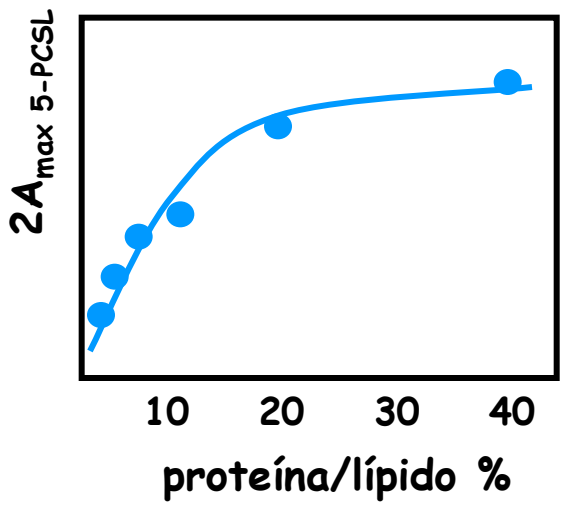
# Efecto de las interacciones lípido-proteína en la movilidad y dinámica de los fosfolípidos



C.A.I.  
**Resonancia Magnética Nuclear y de Espín Electrónico**

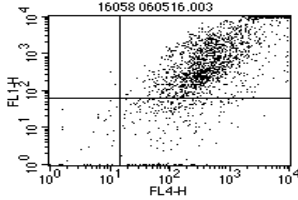
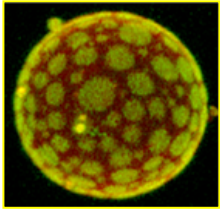
**Resonancia de Espín Electrónico (ESR)**

Plasencia et al., (2004) *Biochem. J.* 377, 183  
 Plasencia et al. (2008) *BBA* 1778, 1274

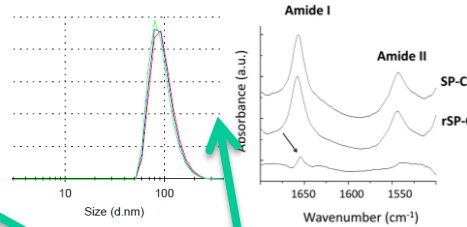


# SURFACTANTE PULMONAR

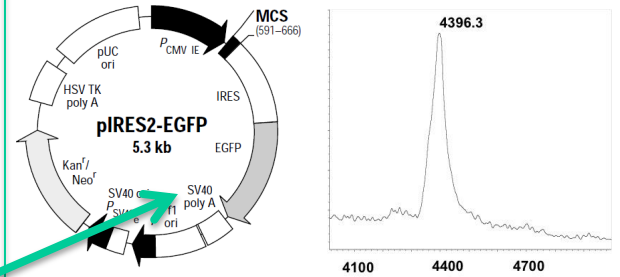
**C.A.I.**  
Citometría y microscopía de fluorescencia



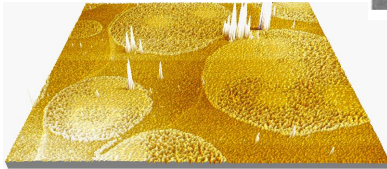
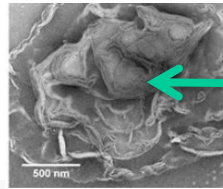
**C.A.I.**  
Espectroscopía y Correlación



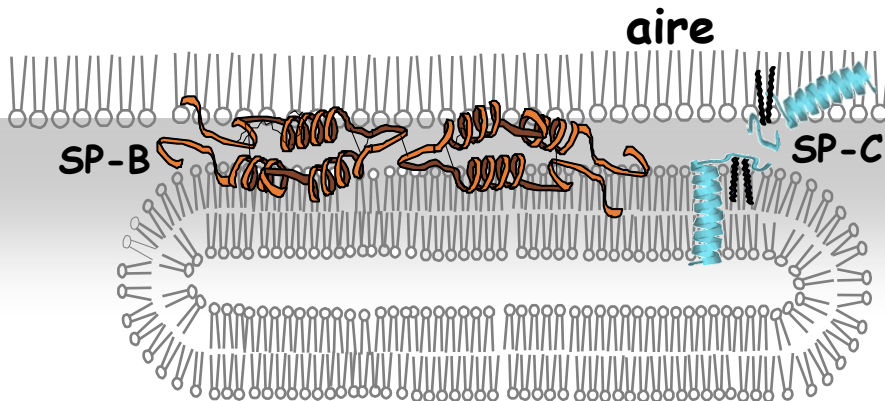
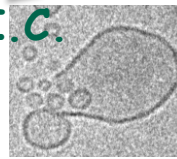
**C.A.I.**  
Genómica y Proteómica



**I.C.T.S.**  
Centro Nacional de Microscopía



**Microscopía**  
C.I.B. - C.S.I.C.



**C.A.I.**  
Resonancia Magnética Nuclear y de Espín Electrónico

