

## 你的外泌体电镜照片能达到发表文章的要求吗？

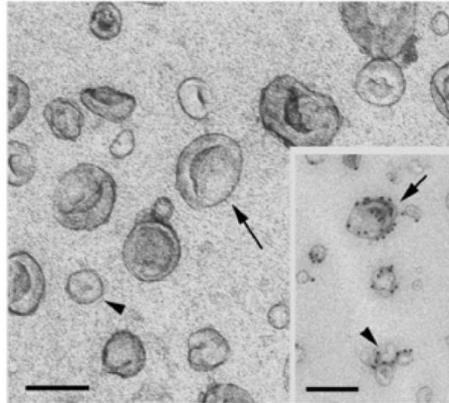
### 前言：

想必这是目前大多数外泌体研究老师的一个痛吧？

### 正文：

外泌体研究目前热火朝天，但问题同样也是火热。

近期收到老师们的反馈，不管用了传统超速离心的方法还是购买的提取试剂盒，也记不清楚做了多少次电镜检测了，但始终没有一张满意的外泌体电镜照片。偶就冒昧询问什么样的照片才是满意的，大多数人竟拿出了同一张图片给了我：



*Théry, Clotilde, et al. "Isolation and characterization of exosomes from cell culture supernatants and biological fluids." Current protocols in cell biology(2006): 3-22.*

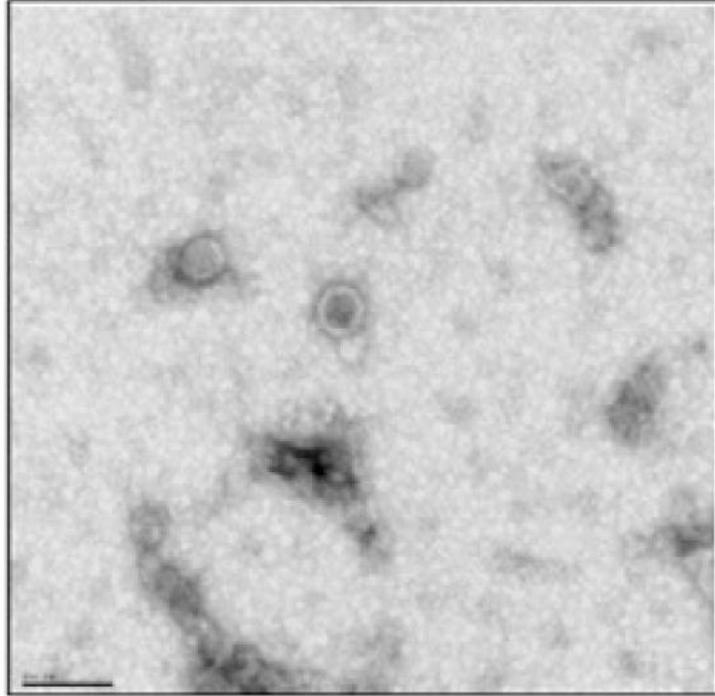
这是外泌体领域的大牛 Théry 在 2006 年发表的外泌体分离鉴定手册上的图样，可以看到电镜视野中大多是略小于 100 nm 的具有清晰膜的茶托样结构，小图中显示免疫胶体金会附着到这些膜结构表面。

我相信一点：Théry 一定是个完美主义者，如此经典的图片，偶觉得可能也没有几个人可以再现的。

于是花了一下午从外泌体文献中搜了近 30 张的电镜照片，给大家瞧瞧大众水平到底是个啥样的！

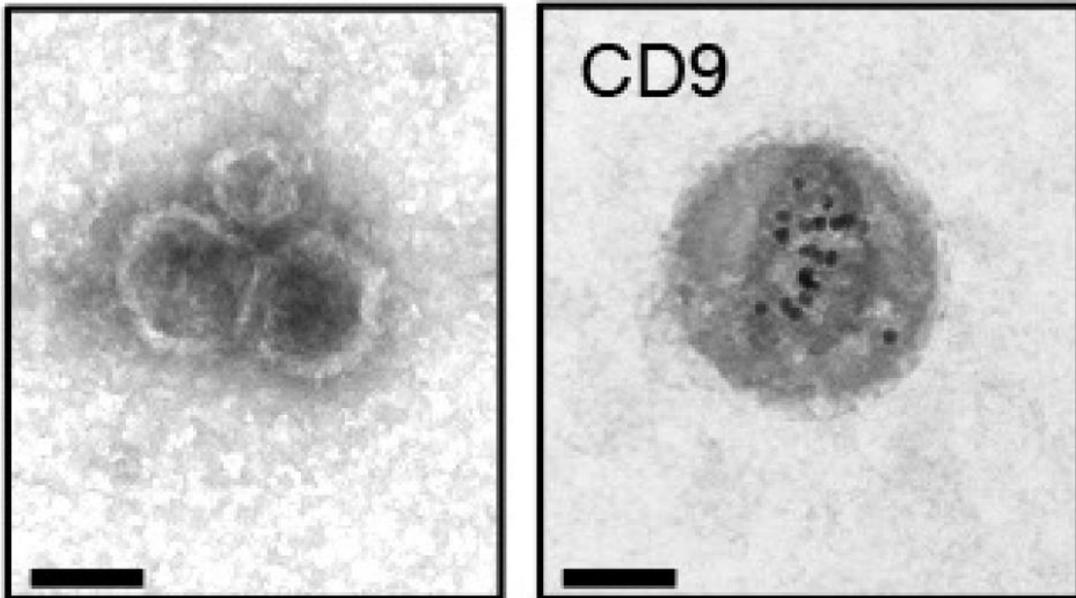
二话不说，上照片！ 先看 CNS 级别的外泌体电镜结果！

Cell. 2017 Oct 5;171(2):372-384.e12. doi: 10.1016/j.cell.2017.08.035.



Electron microscopy analysis of Exos secreted by obese adipose tissue macrophages (ATMs). Scale bar, 200 nm.

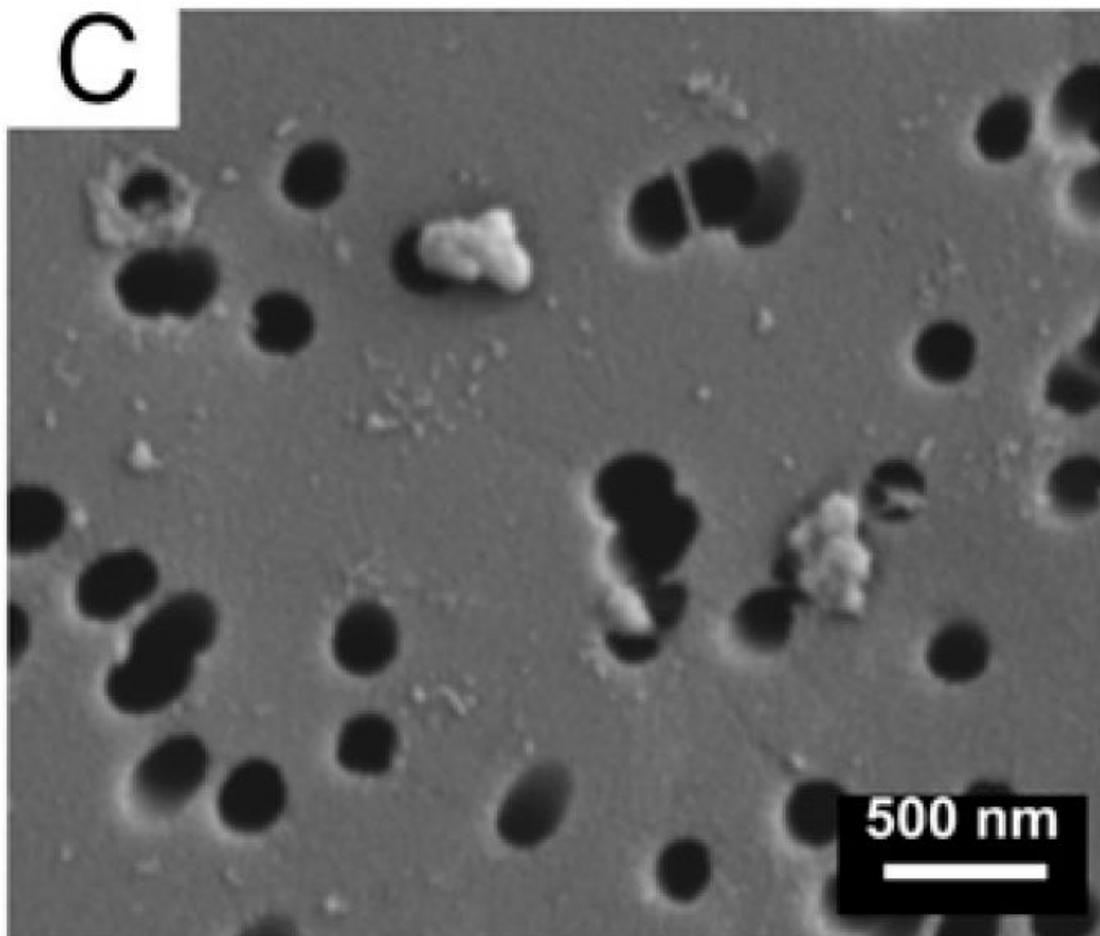
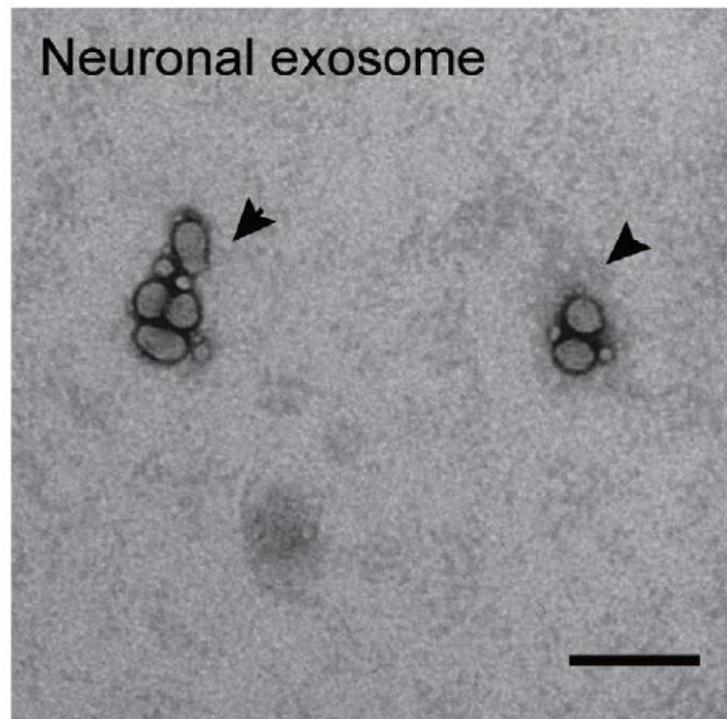
[Nature](#). 2017 Jun 22;546(7659):498-503. doi: 10.1038/nature22341.

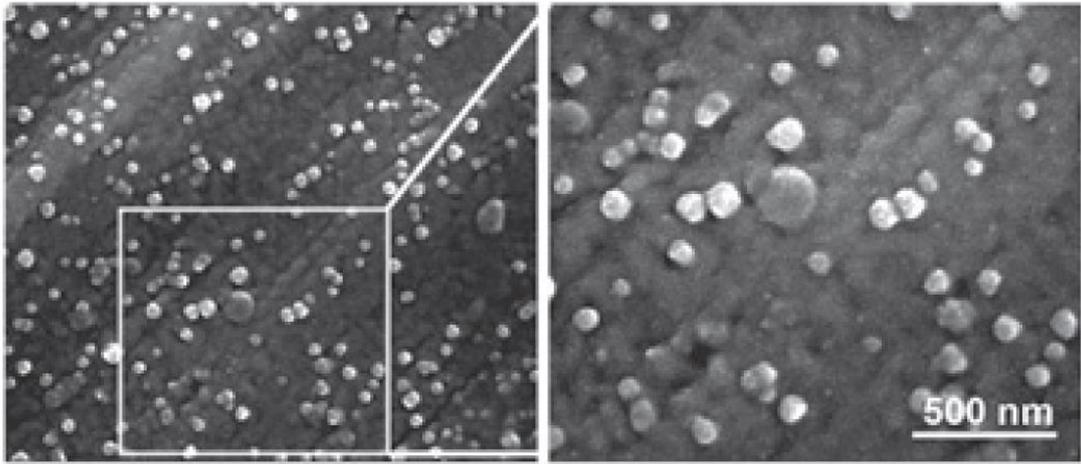


Transmission electron micrographs of exosomes stained with secondary antibody only (left) or stained for CD9 by immunogold (right). Scale bars, 100 nm.

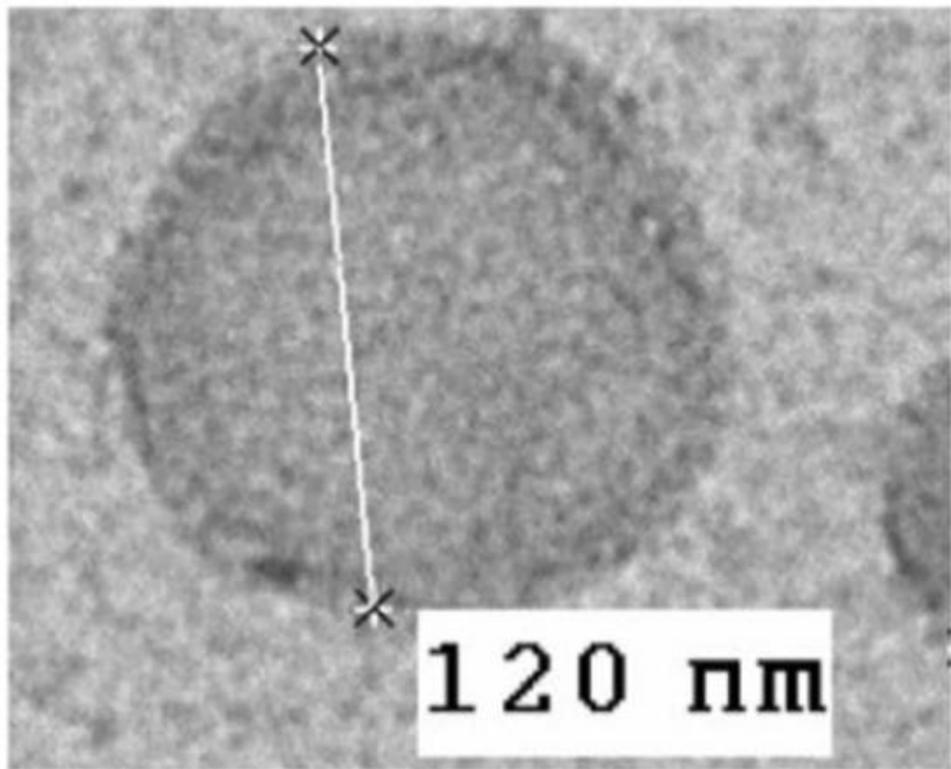
是不是有些人已经乐了？ 自己的照片要比 CNS 级别的要强很多 ^\_^

再看非 CNS 级别的外泌体电镜结果！





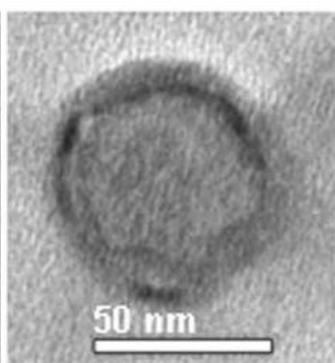
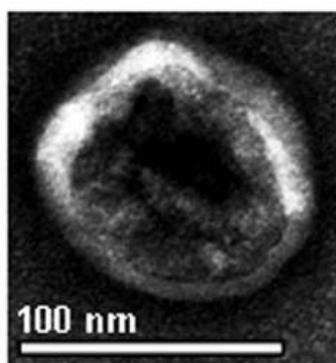
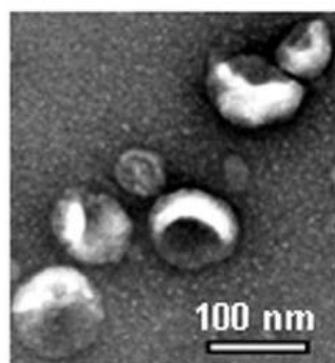
**E x o s o m e s**



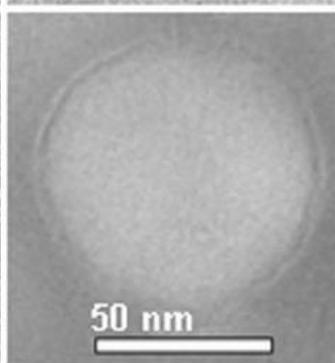
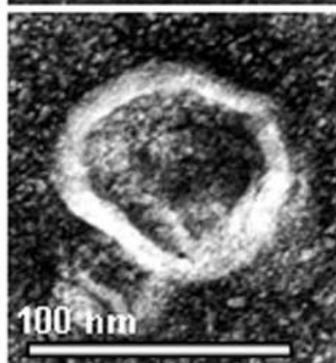
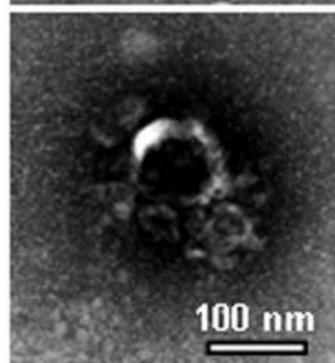
**Ⓜ**

### Exosomes

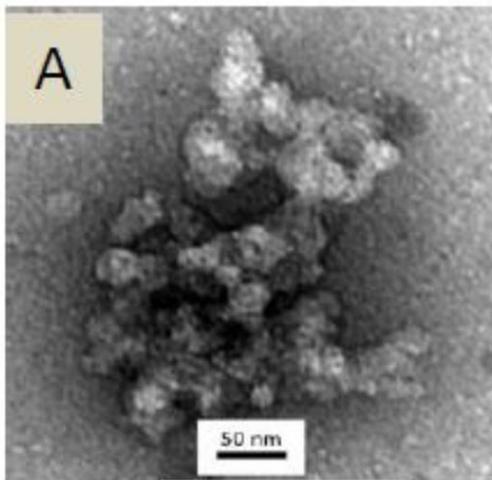
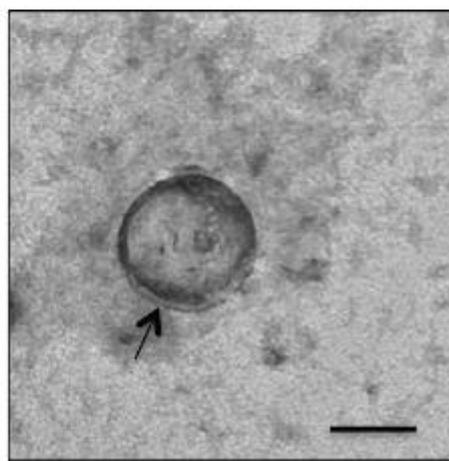
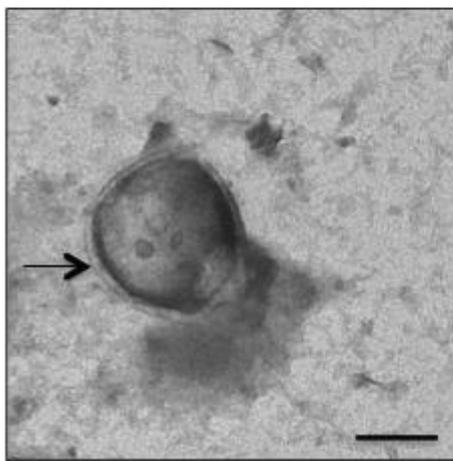
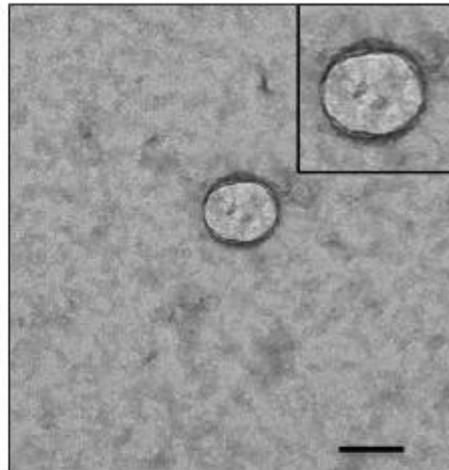
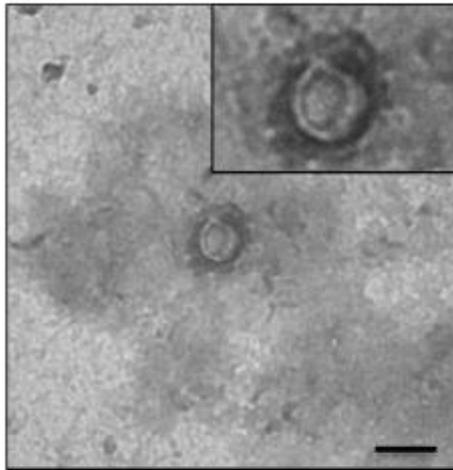
MDA-MB-231 cell



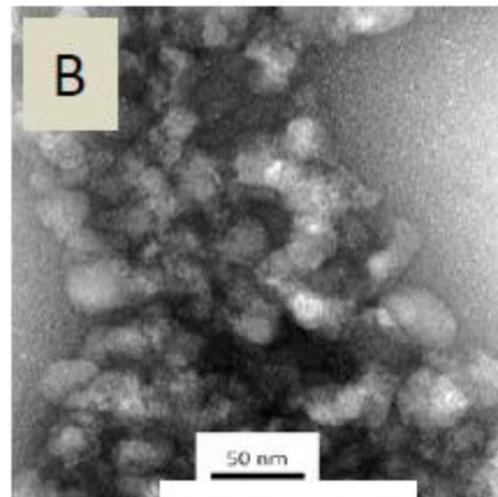
Serum



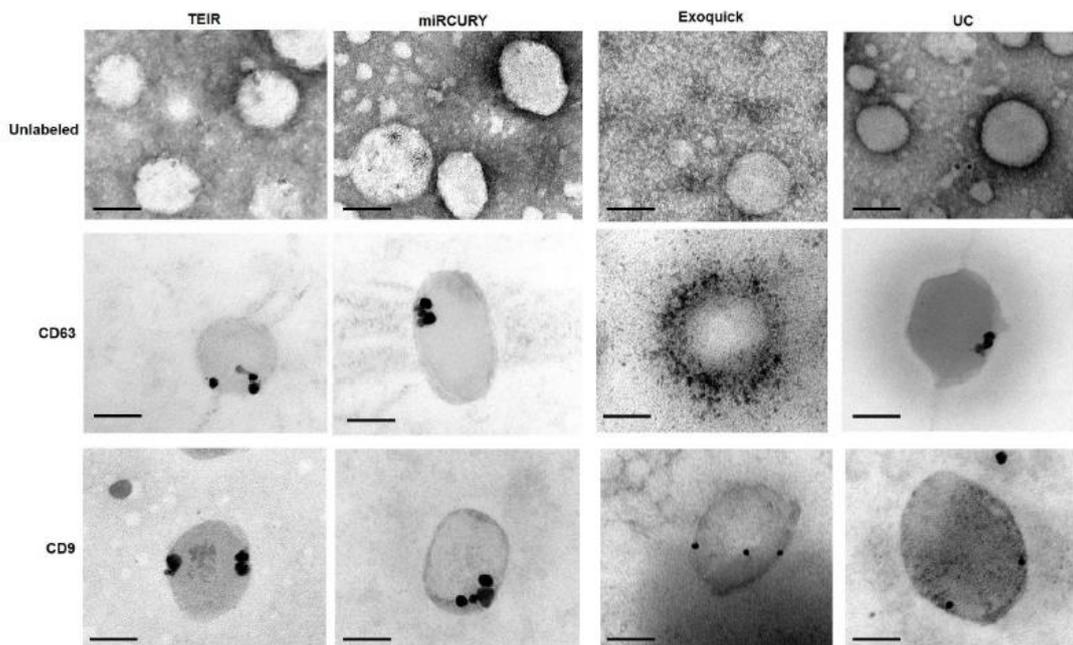
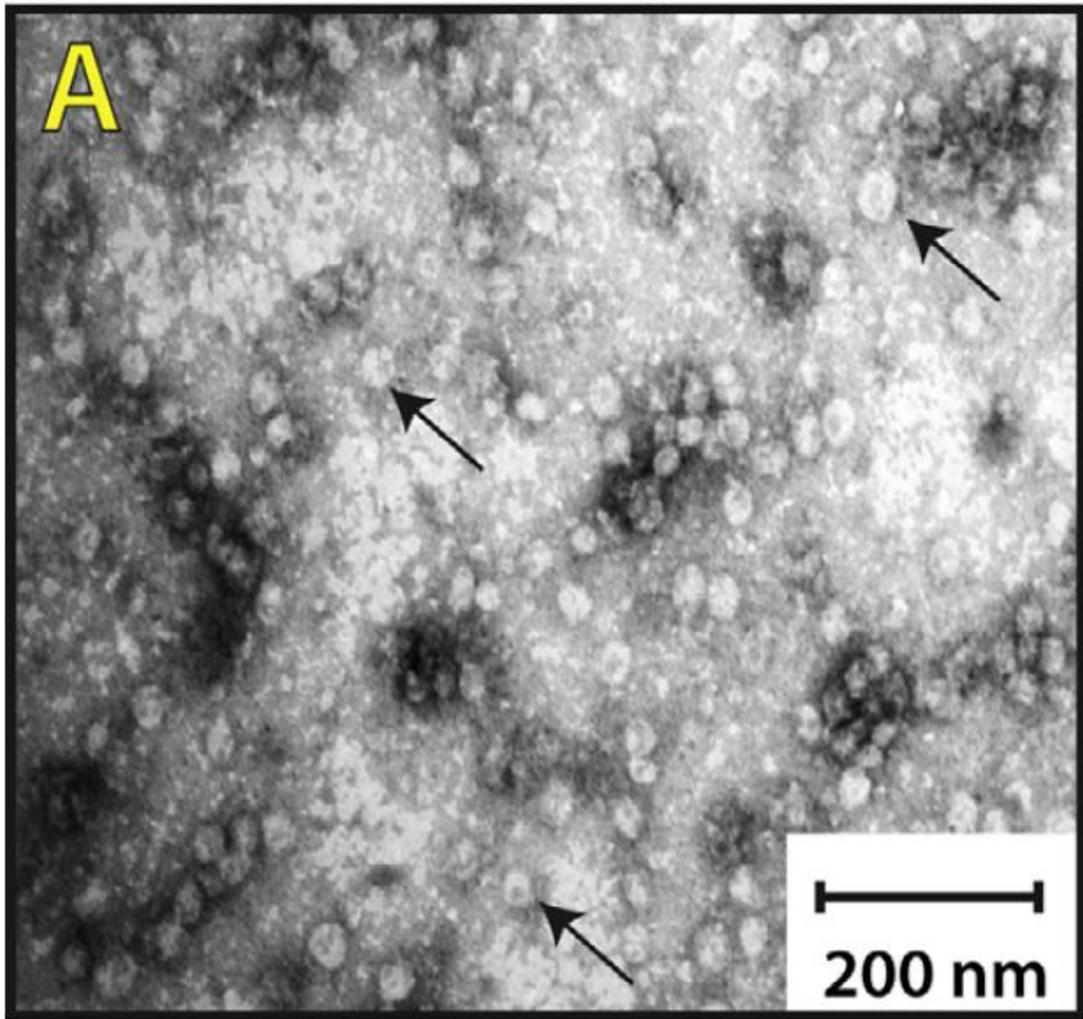


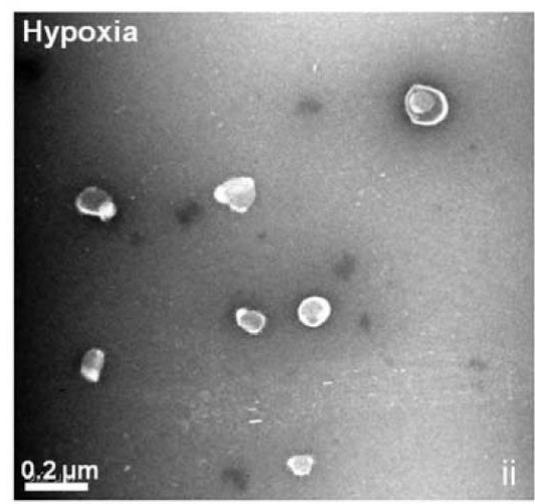
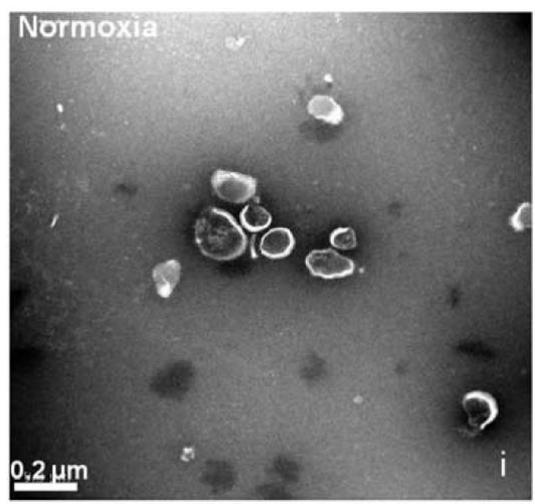
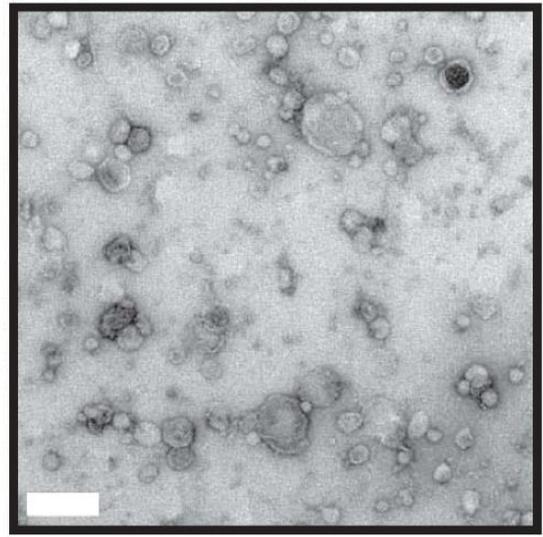
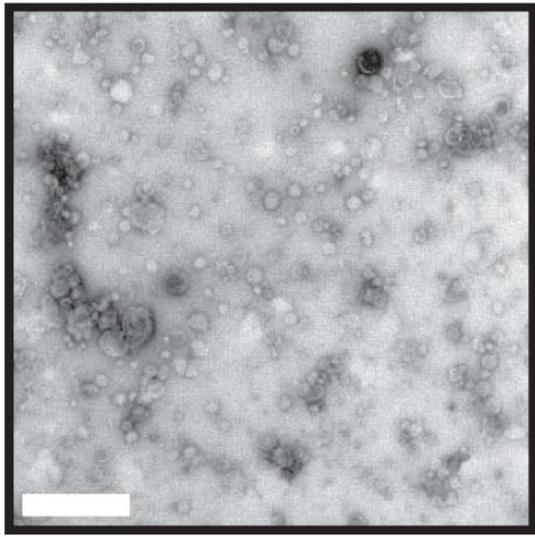
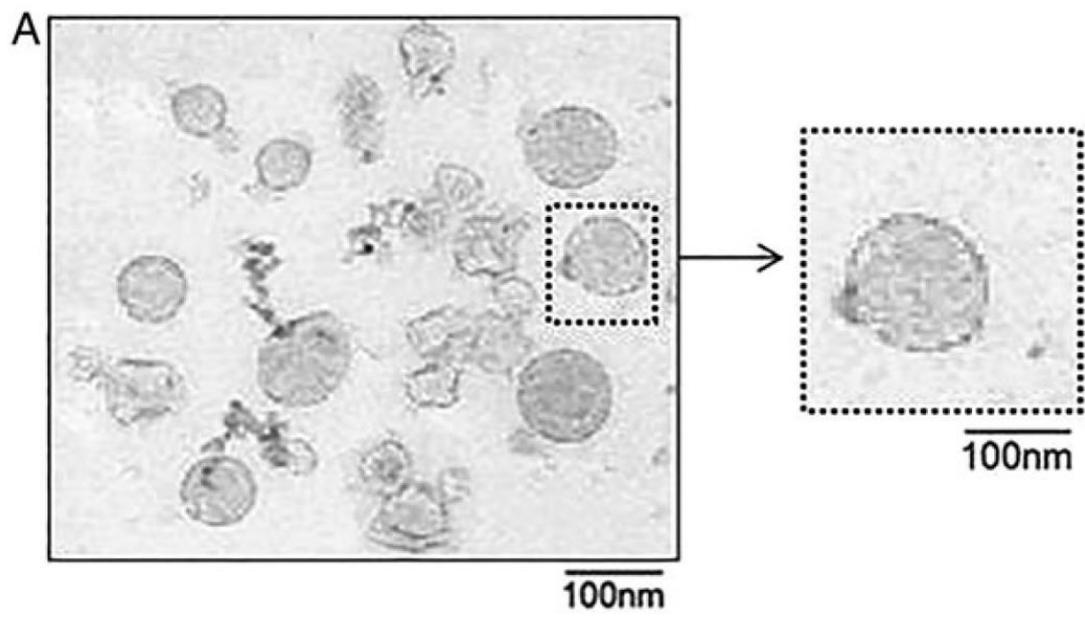


CF-exo

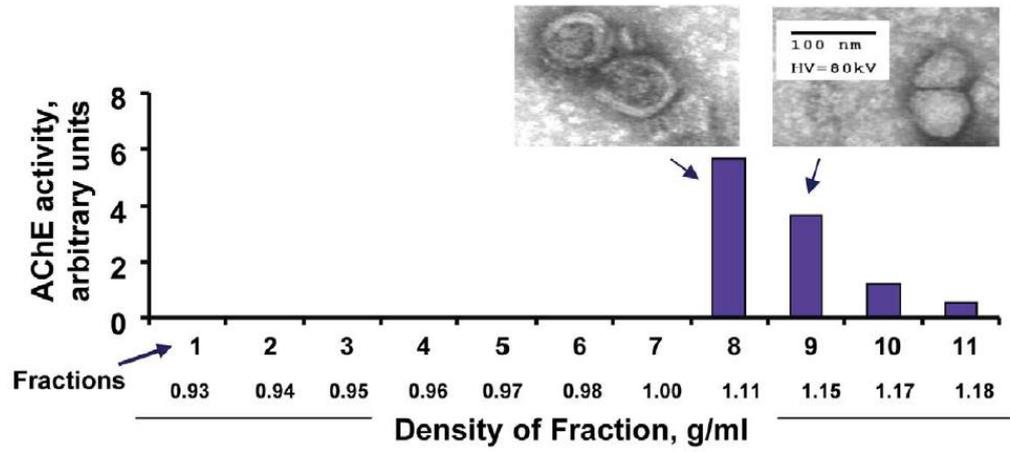


iPS-exo



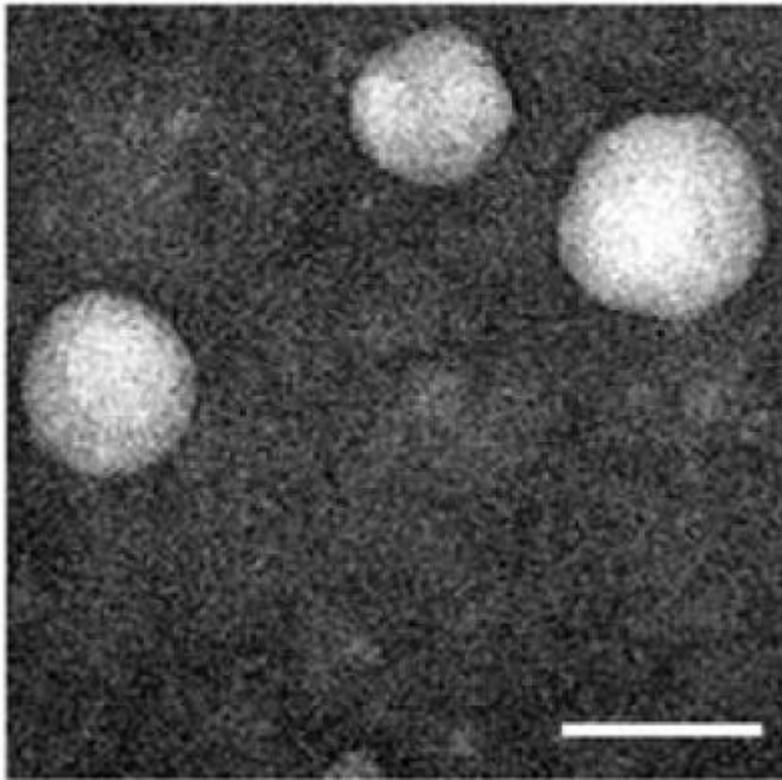


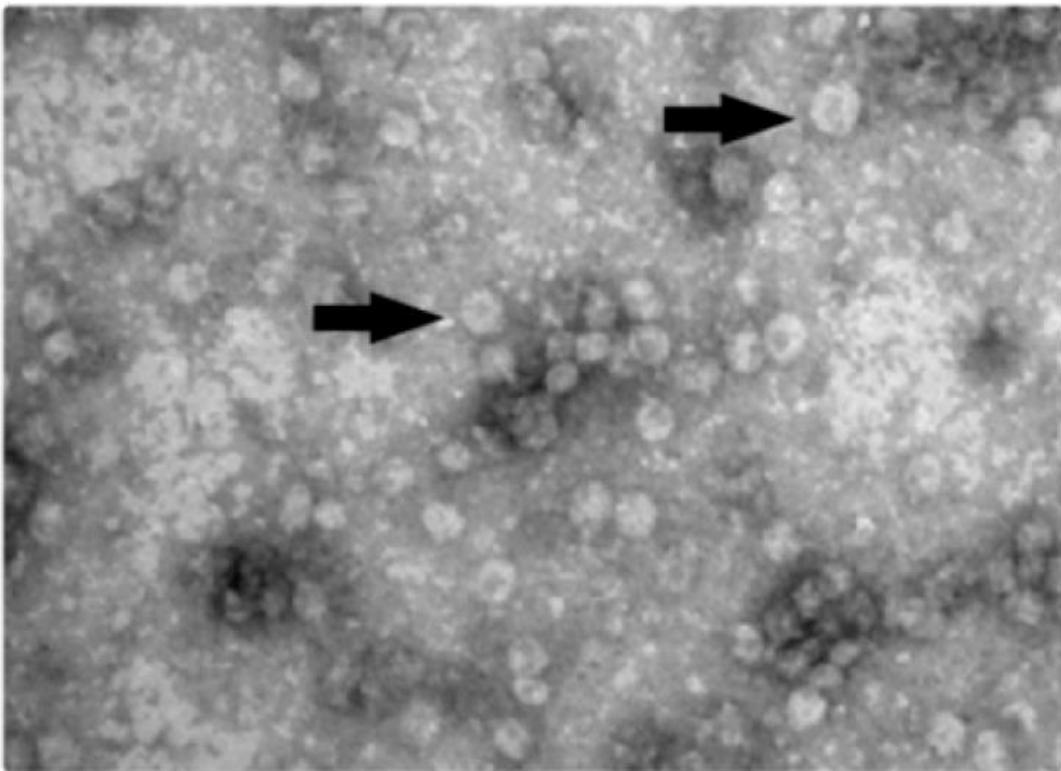
**B**



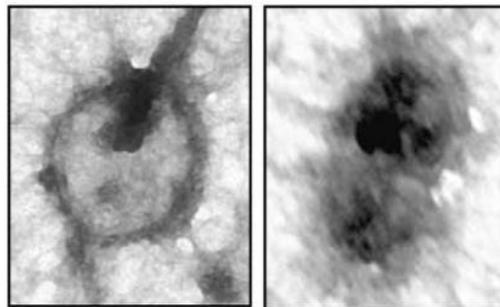
**A**

## Exosome characterization





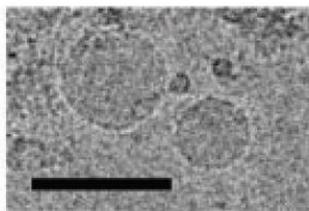
200 nm 



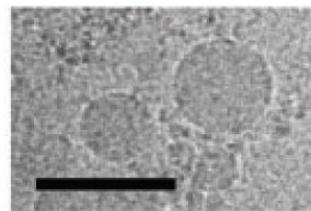
200 nm

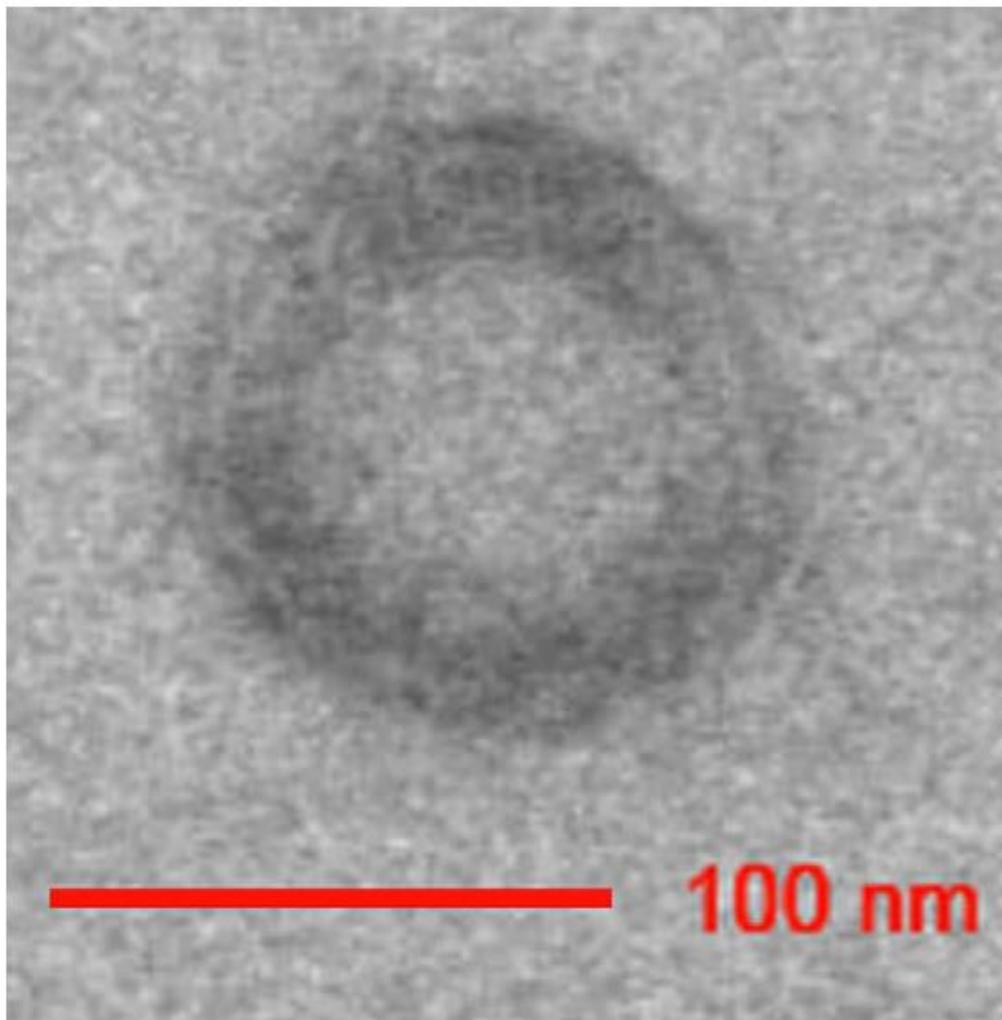
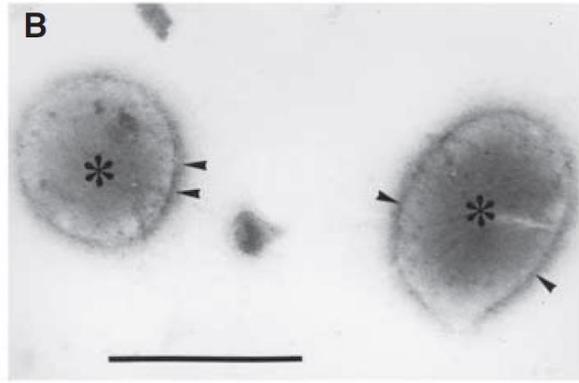
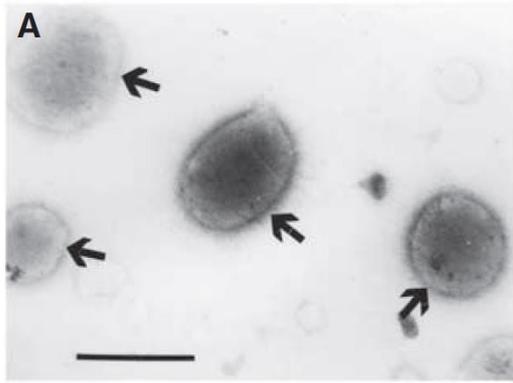


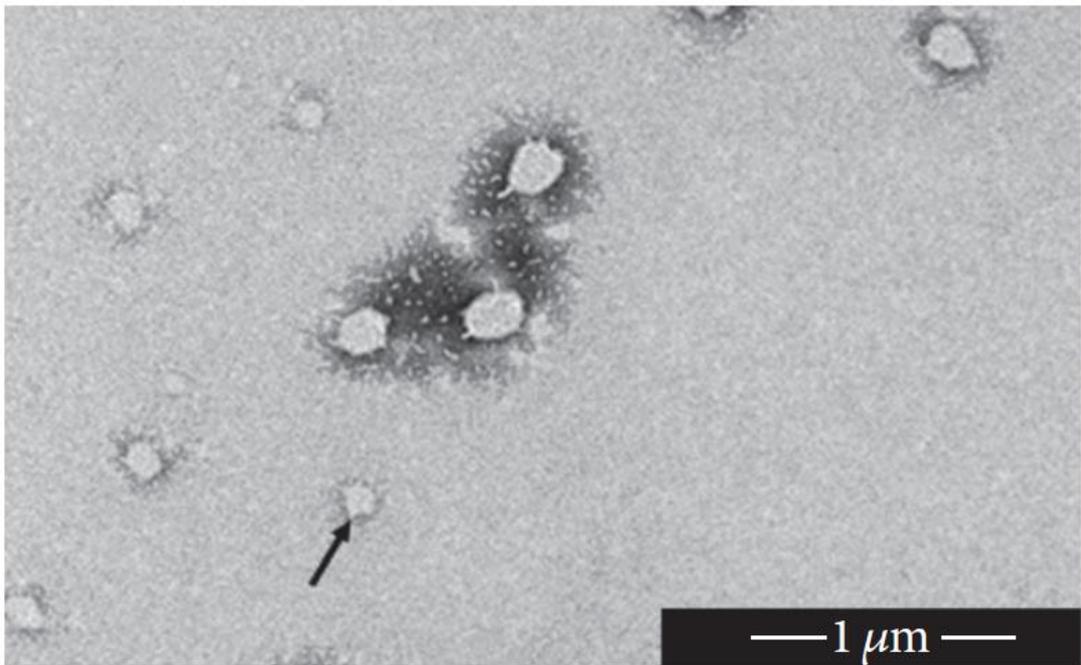
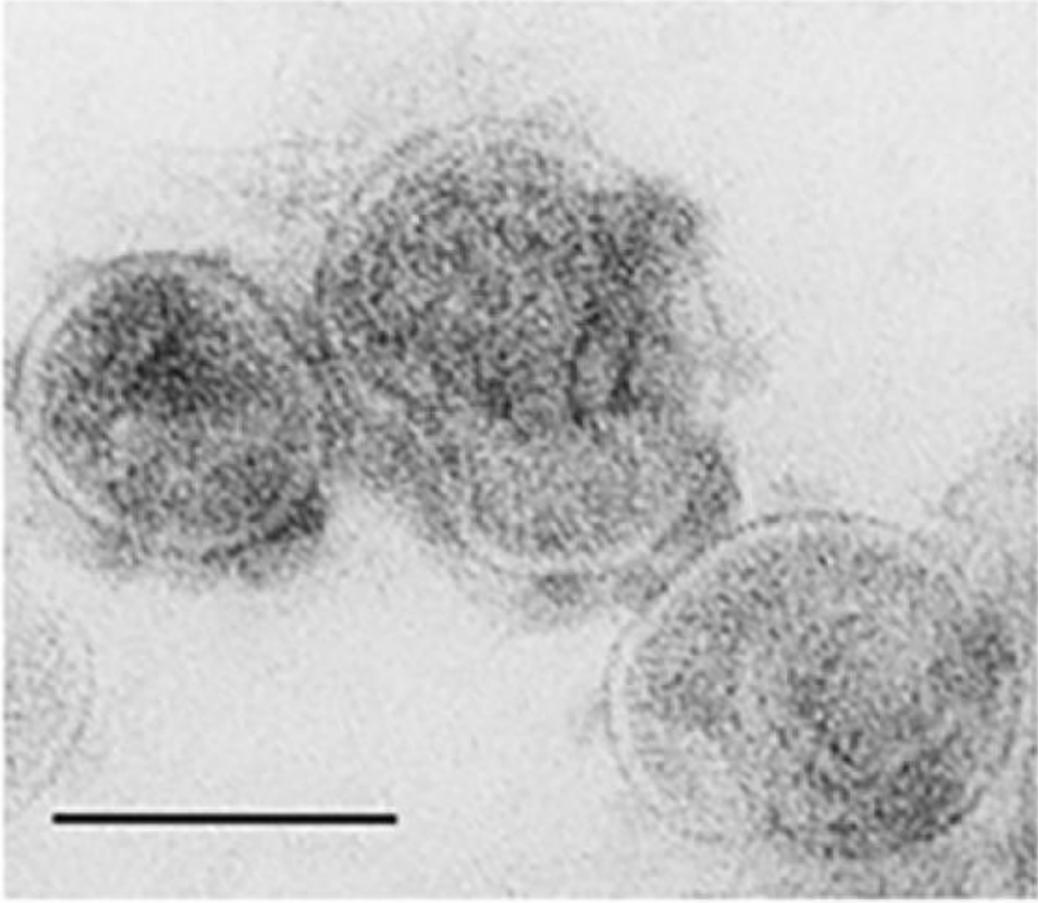
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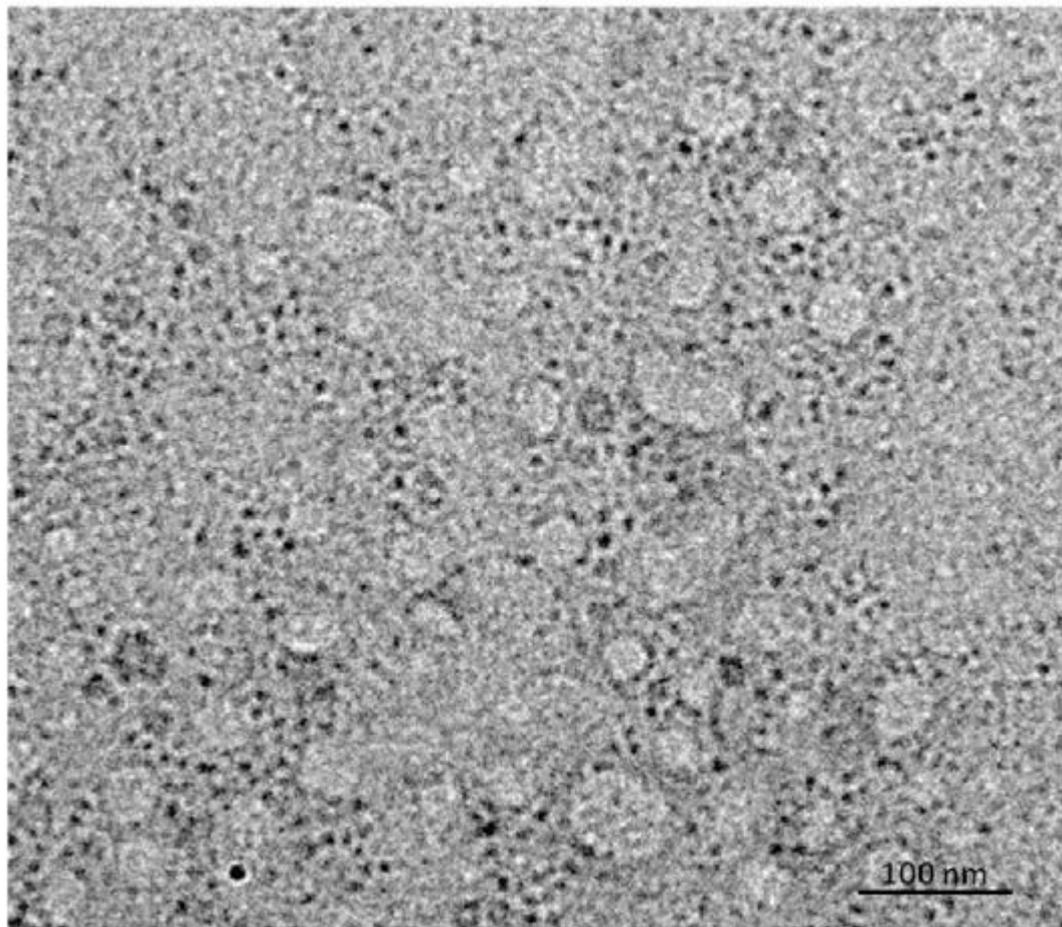
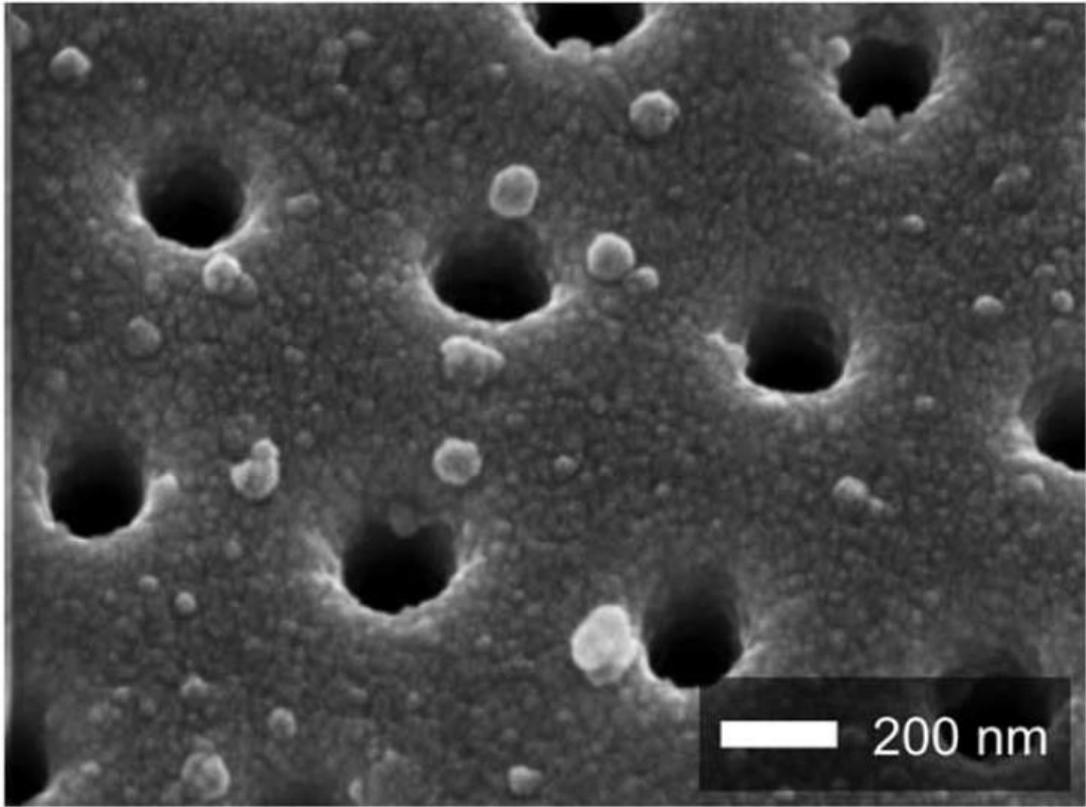


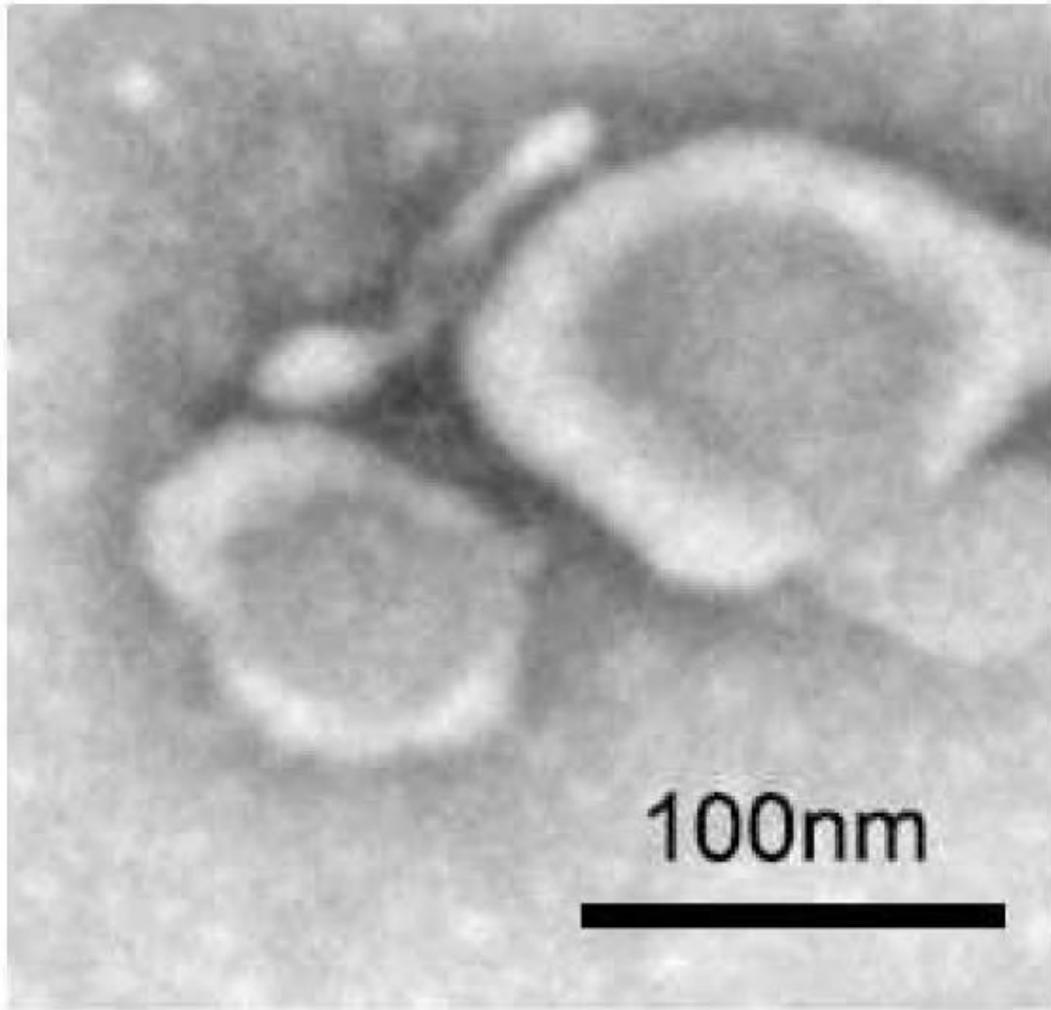
**D**











看完这些照片成后，大家心里是不是踏实多了些？有没有觉得自己的一些结果其实还是可以拿出来用的！

由于篇幅的限制，非 CNS 图片的文献信息未能一一展示，如有需要请邮件至 [umibio@umibo.cn](mailto:umibio@umibo.cn) 进行索要。



上海宇玫博生物科技有限公司

电话: 4006166973 021-60521508

QQ: 3423485078

邮箱: umibio@umibio.cn

网址: <http://www.umibio.cn>

地址: 上海市浦东新区蔡伦路 88 号 1 号楼

