

治療病毒感染新方法

-- NSP物理遮蔽 --



Natural
Clays
天然砂土

人類使用天然黏土之歷史及智慧 從中古代黏土到21世紀之 NSP 發明

砂中潛在的寶石(聖經)
(the hidden treasures of the sand)
(Bible: Deuteronomy申命記33:19)

2021-2

傳統處理疫情方法

1. 疫苗 – (增加人體免疫力)
2. 藥物治療 – (降低發炎症狀及阻止病毒進入體內細胞)
3. (戴口罩/保持社交距離/洗手)

The History of Natural Clays and Applications

天然黏土應用之歷史記載

Historically, clays had been associated with treatments for cholera and bacterial infection.

1. The first recorded use of medicinal clay is on Mesopotamian clay tablets around 2500 B.C. Ancient Egyptians used clays as antiseptics and preservative for making mummies. (古代埃及人消毒劑...木乃伊...)
2. Aristotle (384–322 BC) made the first reference to the deliberate eating of earth, soil, or clay by humans (for **therapeutic and religious purposes**). (亞里斯多德) (治療與宗教目的)
3. Marco Polo described how in his travels he saw Muslim pilgrims cure fevers by ingesting “pink earth” to relieve famine. (馬可波羅) (觀察到回教人用於治療發燒)
4. Dating back to Greek , holy clay tablets were widely traded as cures for poison and the plague; and also used in the Roman Catholic Church. (羅馬天主教會) (用於中毒及瘟疫)

the NSP antiviral

(1960年NASA太空計畫中-膨潤土被用作鈣質補充)



A mountain of clay--Petrified Forest National Park, Arizona. (adopted from Medicinal clay; Wikipedia)

The effects of weightlessness on human body were studied by NASA in the 1960s. Experiments demonstrated that weightlessness leads to a rapid bone depletion. A number of pharmaceutical companies were asked to develop calcium supplements, it was concluded, "the calcium in clay ...is absorbed more efficiently .. [clay] contains some factors promoting calcium utilization and/or bone formation."

Note:

- (1) Bentonite is the raw material for NSP by Prof JJ Lin (2003).
- (2) Bentonite is a water-swelling clay and commonly used as **detoxifiers in animal feeds and Nylon6 polymer nanocomposites, etc.**



J&A Technology (多鏈科技)

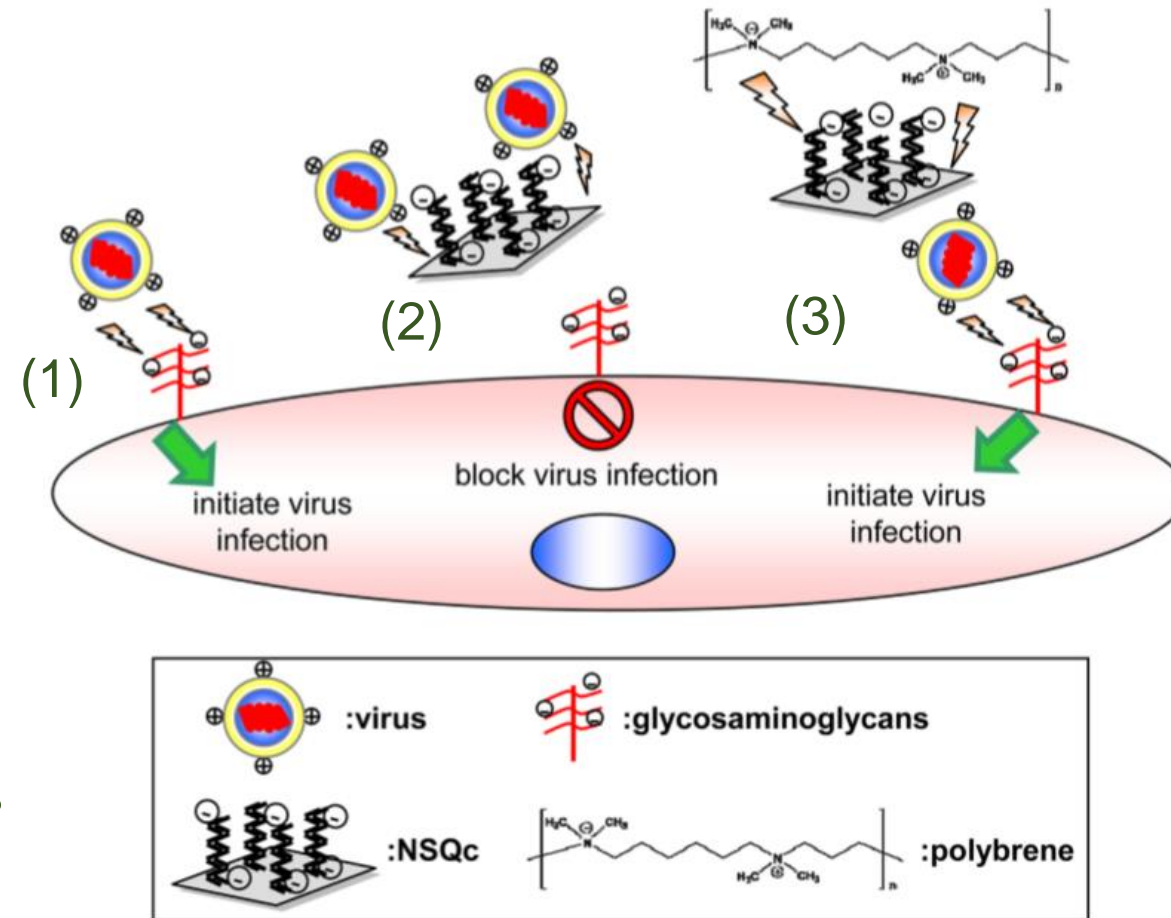
(NSP遮蔽病毒感染)

(2014)

Jian-Jong Liang, Jiun-Chiou Wei, Yi-Ling Lee, Shan-hui Hsu*, **Jiang-Jen Lin***, and Yi-Ling Lin*, **2014**. Surfactant-modified nanoclay exhibits an **antiviral activity with high potency and broad spectrum**, Journal of Virology, 88, 4218-4228.

Taiwanese Patent: 44. 林江珍, 林宜玲, 徐善慧, 梁健忠, 李憶玲, 魏郡菽, 中華民國專利第I546080號 (2013) “脫層黏土/界面活性劑錯合物作為抑制致病性病毒的用途”

Left diagram showing (1) virus entering a host cell through “receptors” (2) NSP shielding virus by opposite charge “attraction”, and (3) the control experiment, a polyamine-cation prematurely interfering NSP and losing ability to capturing virus



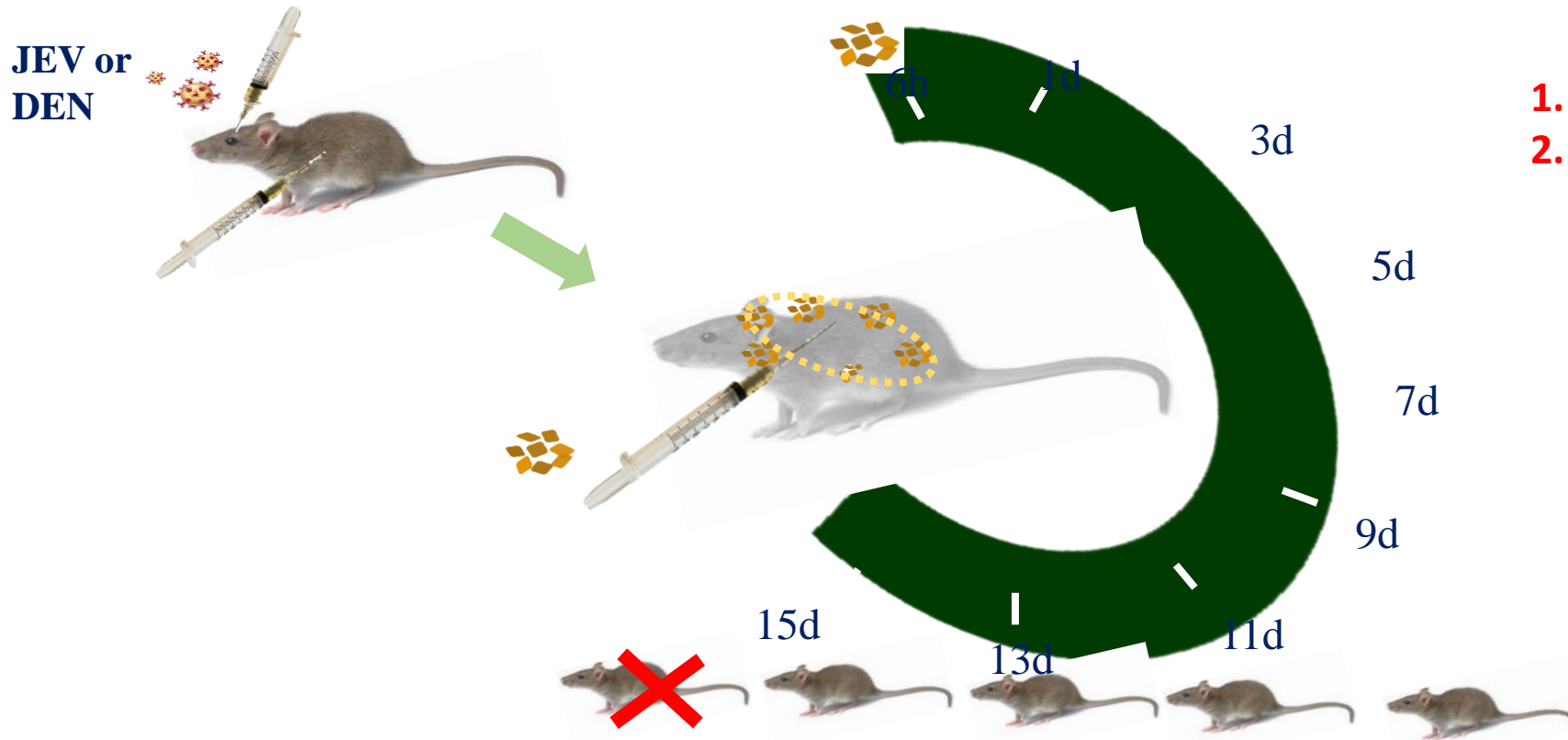
(NSP遮蔽病毒感染-體外及體內測試)

In vitro	NSP-a	NSP-b	NSP-c	AgNP (control)
Concentration of suppresses the plaque-forming – JEV (IC ₅₀) (µg/ml)	2.2	11	6.6	Silver or AgNP is less effective than NSP with NSP-a > -c > -b
Concentration of 50% cytotoxicity, CC ₅₀ (µg/ml)	48	72	70	
Therapeutic index (CC ₅₀ /IC ₅₀)	22	6.7	11	
In vivo (mice fatality rate)				
Survival rate after JEV injection then NSP (µg/ml) treatment (without NSP: 20% survival)	10 (100%)	20 (80%)		
Survival rate after DEN injection then NSP (µg/ml) (without NSP: 0% survival)	20 (100%)	20 (100%)		

- Hsu, Lin and Lin, Journal of Virology, 88, 2014, 4218.
- Note: in vivo tests, the survival rate increased from 20% up to 100 % by NSP injection into mice at 20 (µg/ml)

NSP遮蔽病毒(動物測試) -- 減少死亡率 80% → 0% Treating JEV, dengue and influenza A Infections

Hsu, Lin and Lin, *Journal of Virology*, 88, 2014, 4218

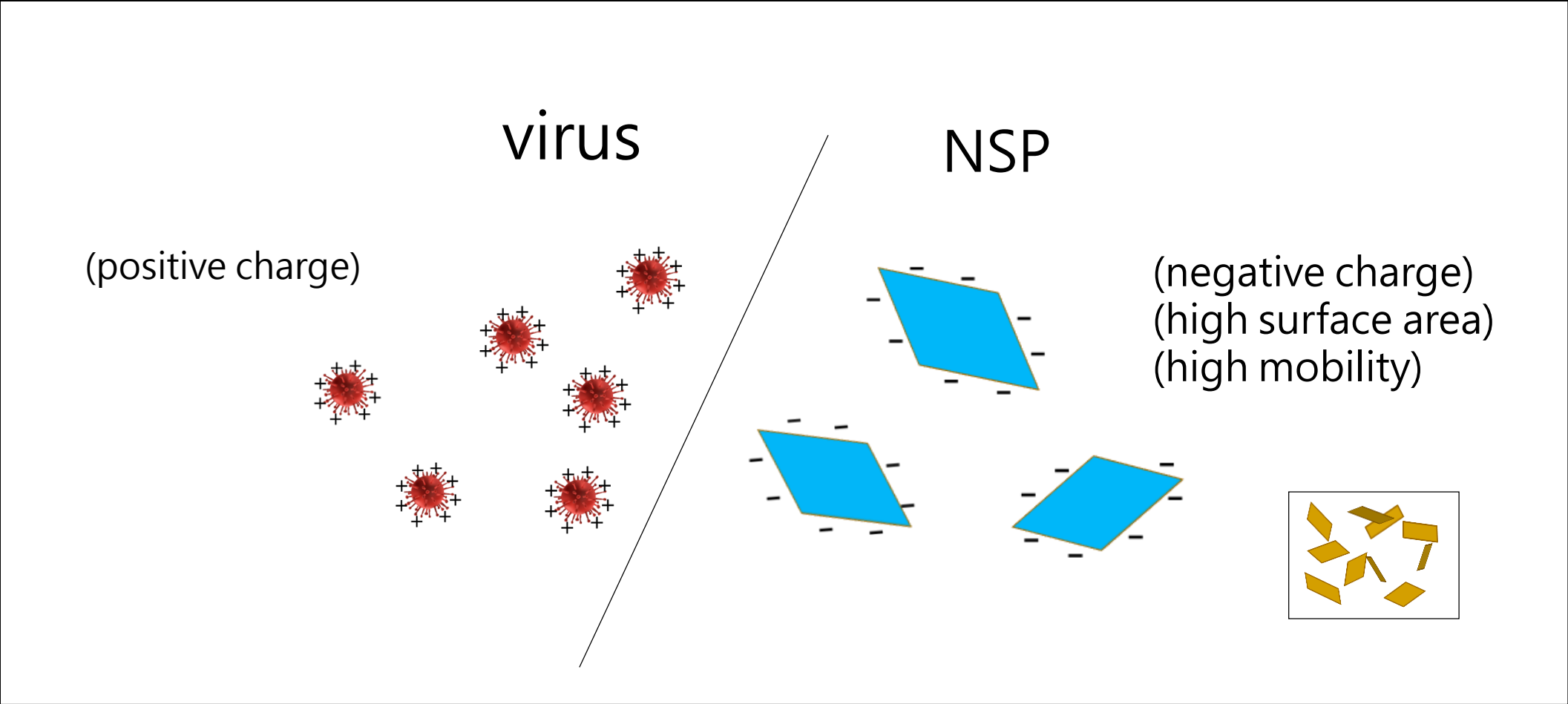


1. **疫苗**: 免疫系統認識特定病毒
2. **藥物**治療: 病毒感染後造成的症狀得到緩和

3. **NSP物理盾牌效應**:
in vitro and in vivo
Shielding between virus and cell

NSP Shielding Virus (reducing fatality rate from 80-100% to 0-20% in mice tests)

Unique NSP-Virus Surface Adsorption



抵抗病毒之新方法

傳統療法 -- 疫苗 /藥物治療

NSP物理法

2000年奈米技術應用製造NSP。奈米矽片具備有 “遮蔽” 病毒並且保護正常細胞的功能。傳統的方法為化學治療處理，而NSP效應為物理性且安全。動物測試證明了其高效率 and 用於治療病毒感染的潛力，可做為未來防禦病毒感染及阻止疫情傳播的新方法。

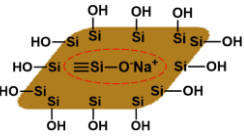
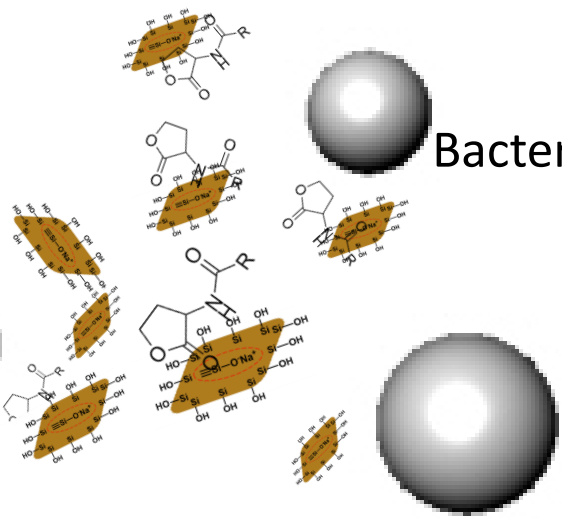
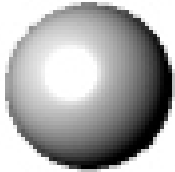
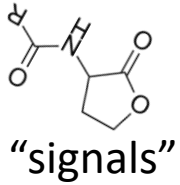
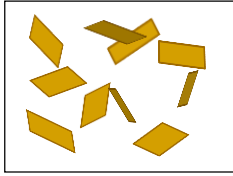
NSP未來應用

1. 噴劑及塗層: 口罩及個人防護設備，醫院，飯店，飛機和公共場所...
2. 消毒劑 (替代漂白劑) : 用於環境大面積噴霧消毒，除臭和清潔
3. 乾洗手液 (取代酒精及含氯之化合物)
4. 漱口水 (物理性捕抓/遮蔽病毒; 除臭和清)
5. “NSP物理療法” : 經過醫學測試用於口服和注射，以保護人體細胞免受病毒感染

NSP抗病毒功能結合複合材料之應用

1. NSP抗病毒塗料 (口罩/個人保護設備 (PPE)/3C產品/鞋材/家具/環境消毒...)
2. NSP添加基材改質 (複合型添加劑: 船底油漆 antifouling, 纖維紡織品,...)
3. NSP取代有機殺菌劑 antiseptics / 消毒劑 disinfectants

Bacterium Quorum Quenching

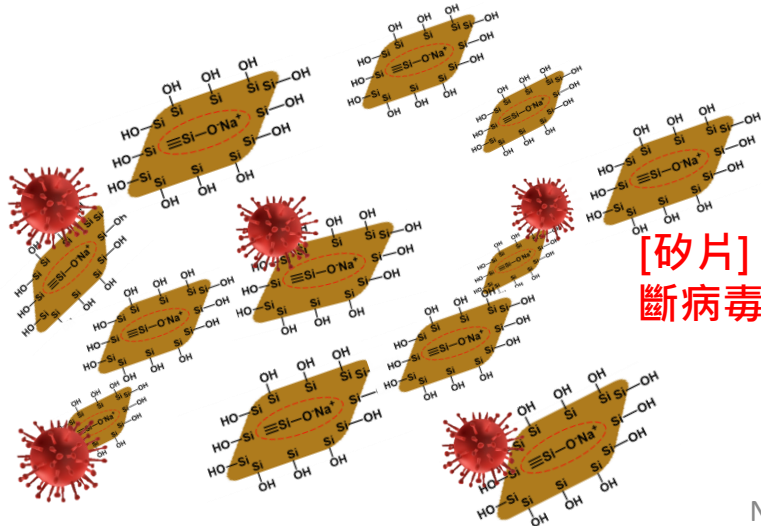


NSP
 100 x 100 x 1 nm
 18,000 Si-O-Na⁺
 High surface 750 m²/g



Virus
 (protein + RNA)

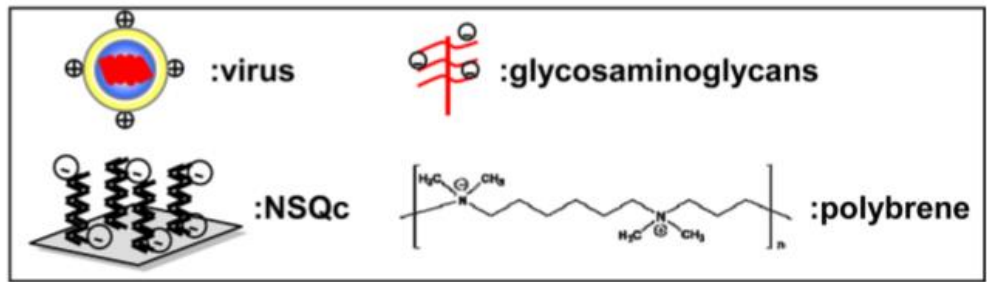
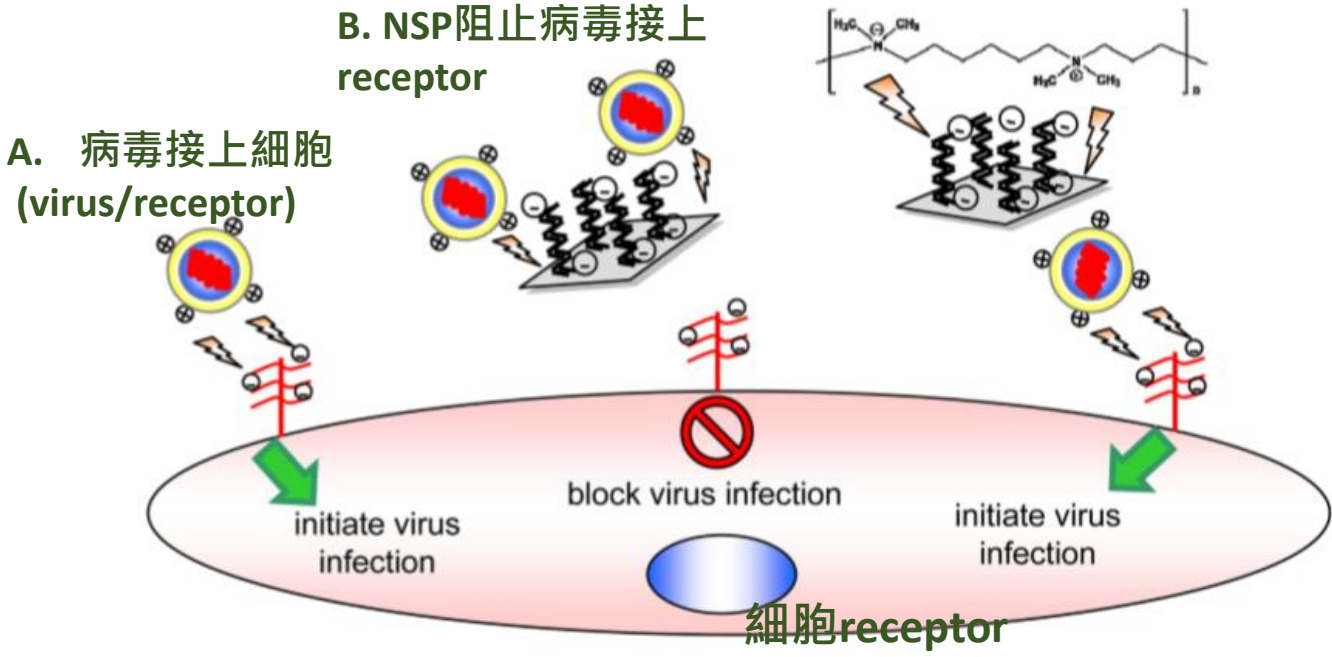
Physically Shielding Virus



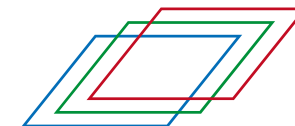
[矽片] 物理性貼附以阻斷病毒入侵!

NSP effect New Mechanism !

C. [控制組]: 添加正離子作用NSP, NSP失效; 病毒再度攻擊receptor (control test)



JJ Lin et al. 2014., Journal of Virology, 88, 4218



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