SUPPORTING INFORMATION:

Bioengineering Silicon Quantum Dot Theranostics using a Network Analysis of Metabolomic and Proteomic Data in Cardiac Ischaemia

Translating Biomarkers to Theranostics

[1]Folarin Erogbogbo, [1]Jasmine May, [1]Mark Swihart, [1]Paras N. Prasad, [2]Katie Smart, [3]Seif El Jack, [4]Dariusz Korcyk, [5]Mark Webster, [5]Ralph Stewart, [6]Irene Zeng, [7]Mia Jullig, [8]Katherine Bakeev, [9]Michelle Jamieson, [9]Nikolas Kasabov, [10]Banu Gopalan, [9]Linda Liang, [9]Raphael Hu, [9]Stefan Schliebs, [7]Silas Villas-Boas, [3]Patrick Gladding

[1]University at Buffalo, New York
[2]Lanzatech, Auckland
[3]North Shore Hospital, Auckland
[4]Princess Alexandria hospital, Brisbane
[5]Green Lane Cardiovascular Service, Auckland
[6]CCRep, Middlemore hospital, Auckland
[7]School of Biological Science, Auckland
[8]CAMO Software, New Jersey
[9]KEDRI, Auckland University of Technology
[10]Lerner Research Institute, Cleveland

Corresponding Author:

Patrick Gladding,
Address: Northshore Hospital
Waitemata DHB
Email: patrickg@theranosticslab.com

Table S1. Potential biomarkers: common five metabolites identified by bioinformatic analysis of aortic blood and cross-referenced with coronary sinus data

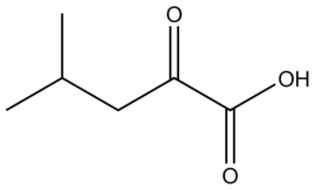
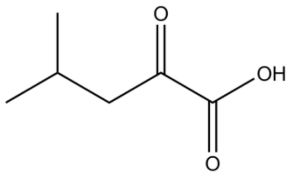
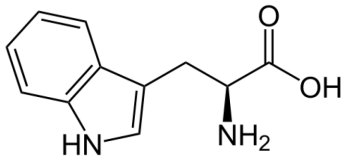
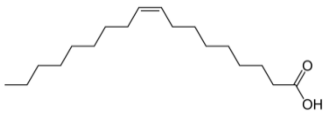
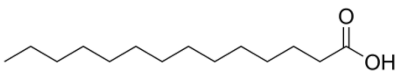
Metabolite
Methyl-2-oxopentanoicacid 
Serine 
Tryptophan 
Oleic acid 
*Myristic acid 

Table S2 Differences between silica and silicon nanostructures

Silica in nanostructures	Silicon nanocrystals
Formula – SiO_2	Formula - Si
Used to encapsulate active materials e.g gold	Used as Active Material e.g. optical imaging
Amorphous	Crystalline
Non-Luminescent	Luminescent
Well studied	New and novel material
Generally used as a Controllable Coating	Never used as coating
Never used for size controlled emission	Used for sized tunable emission
Not the main focus of studies (other materials, such as gold, quantum dots, drugs,)	The main focus of its' studies (how can it be used for imaging, how does it interact)

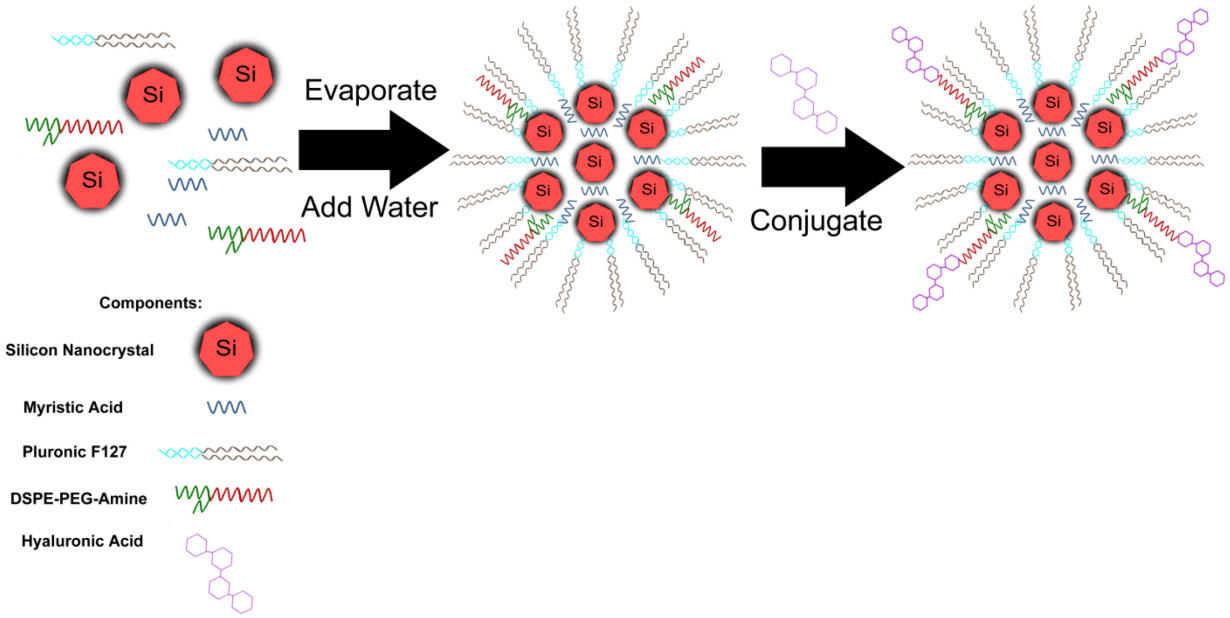


Figure S1. Depiction of an encapsulation process for silicon and myristic acid.

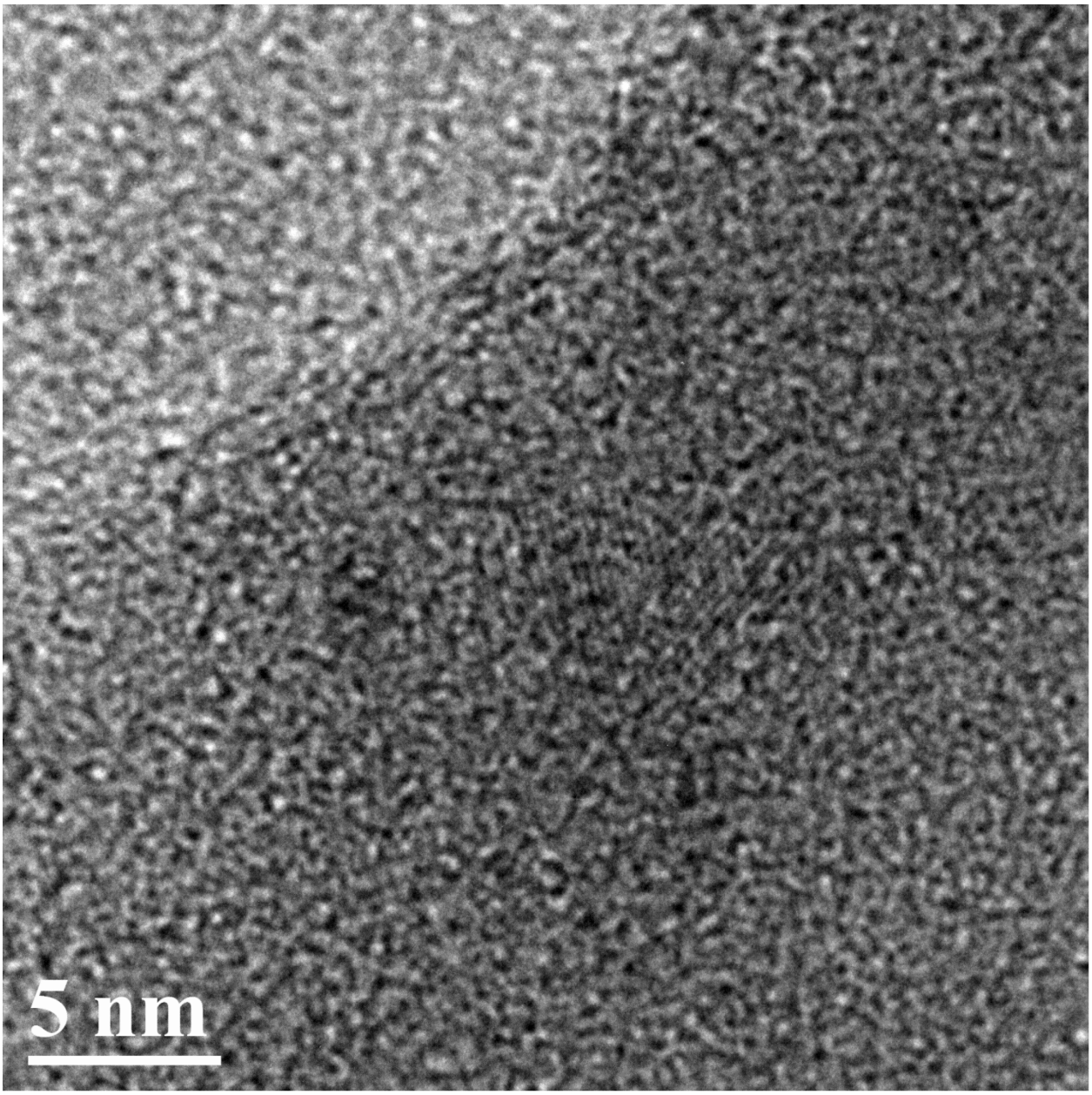
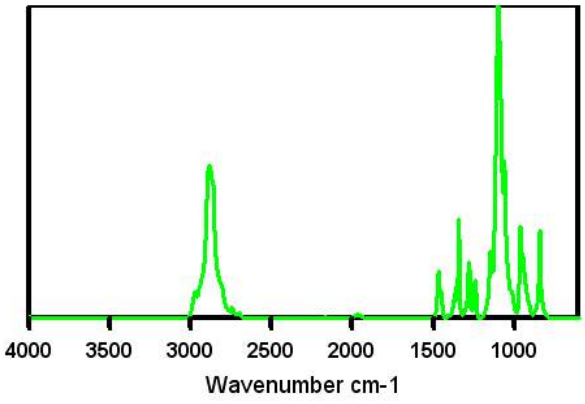


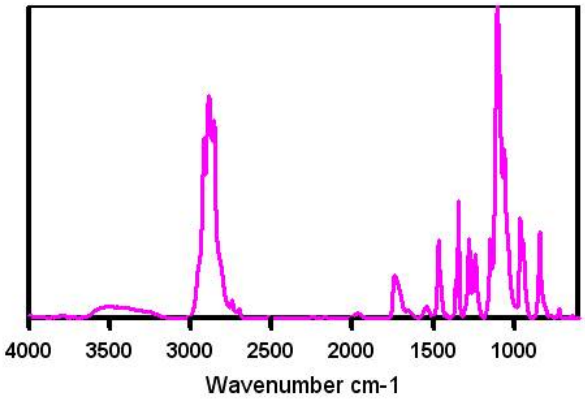
Figure S2. Larger image of TEM in Figure 5c.

Characterization data from components related to the nanostructure are depicted below.

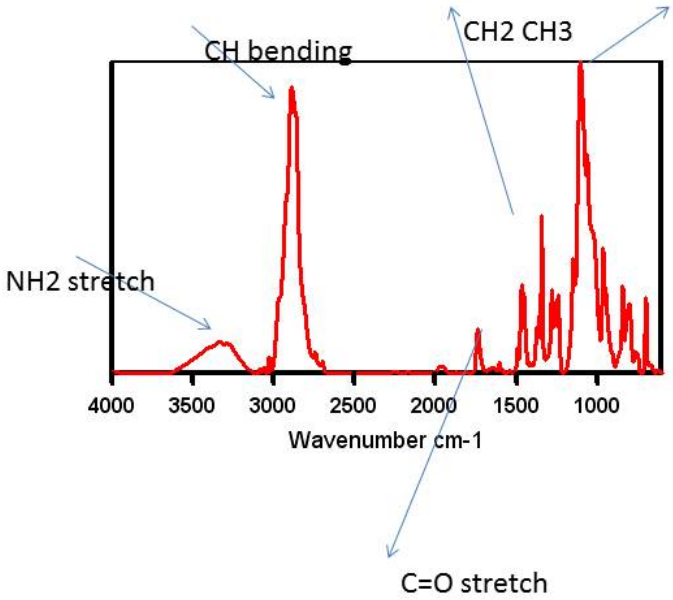
F127



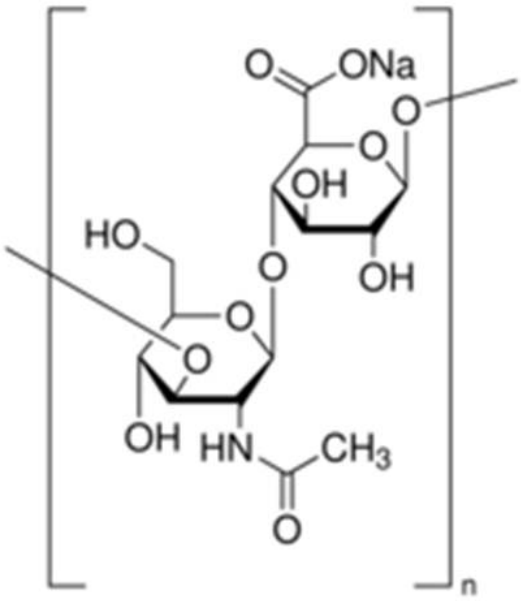
Dspe/peg/amine

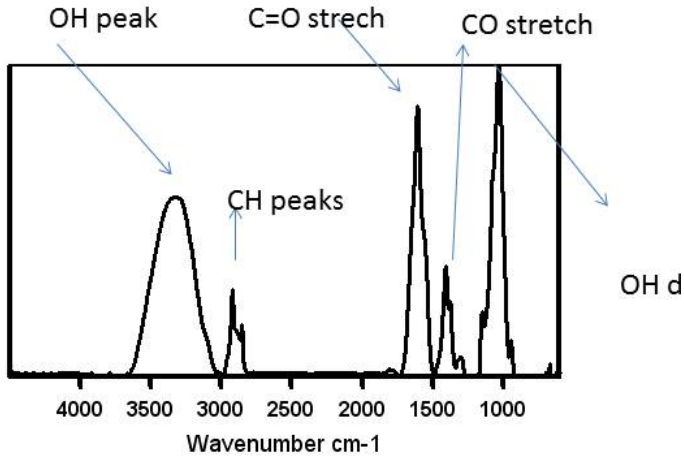


Msi(f127+Dspepegamine)

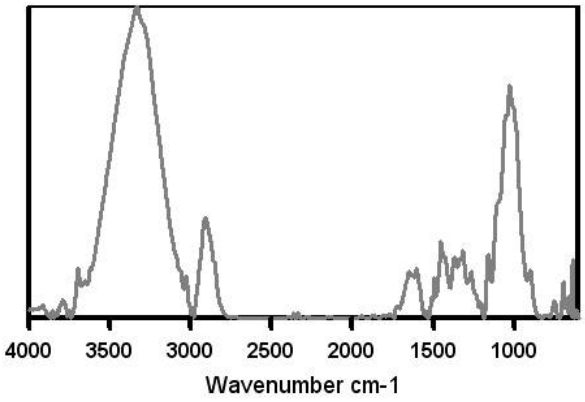


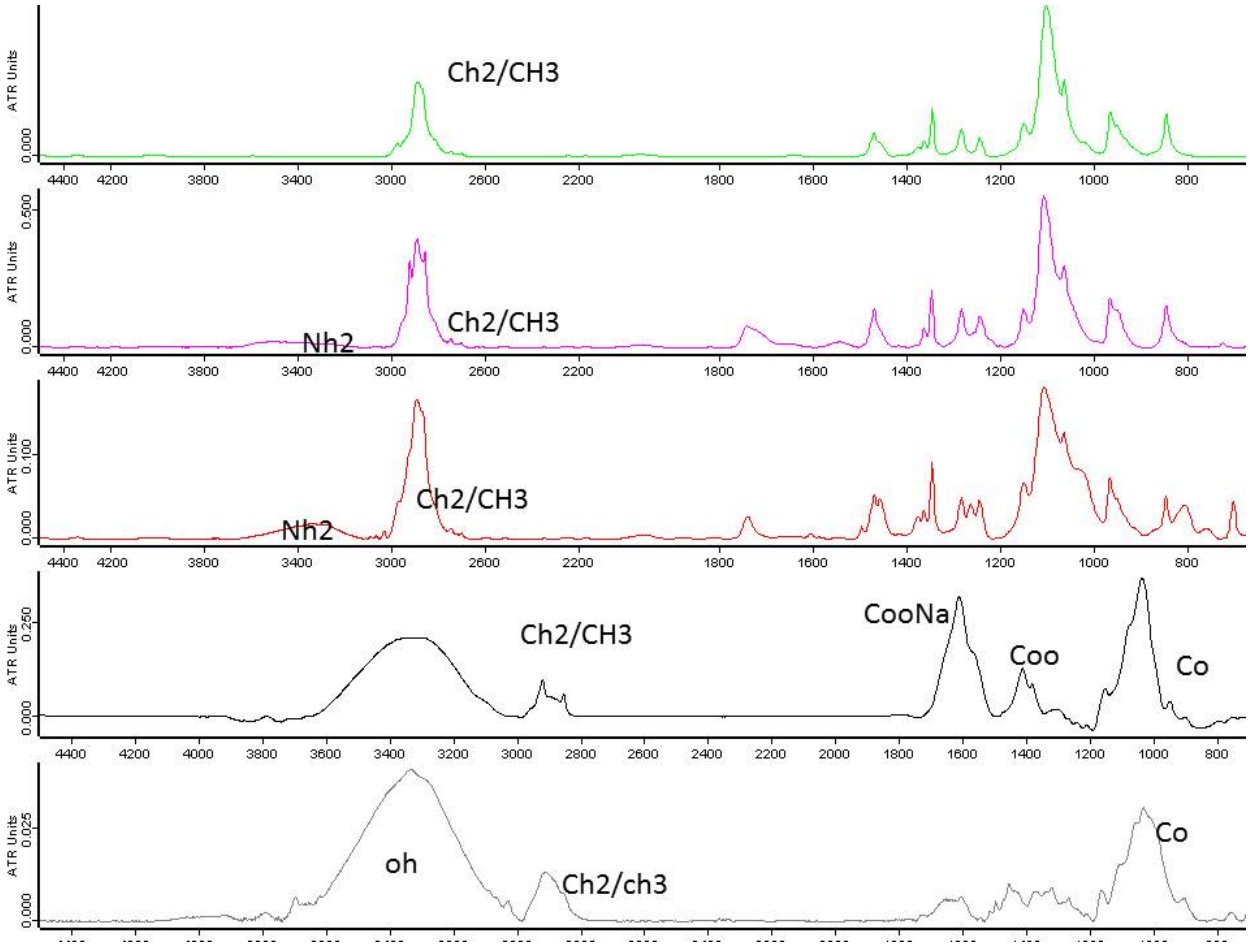
Hyaluronic Acid Sodium salt

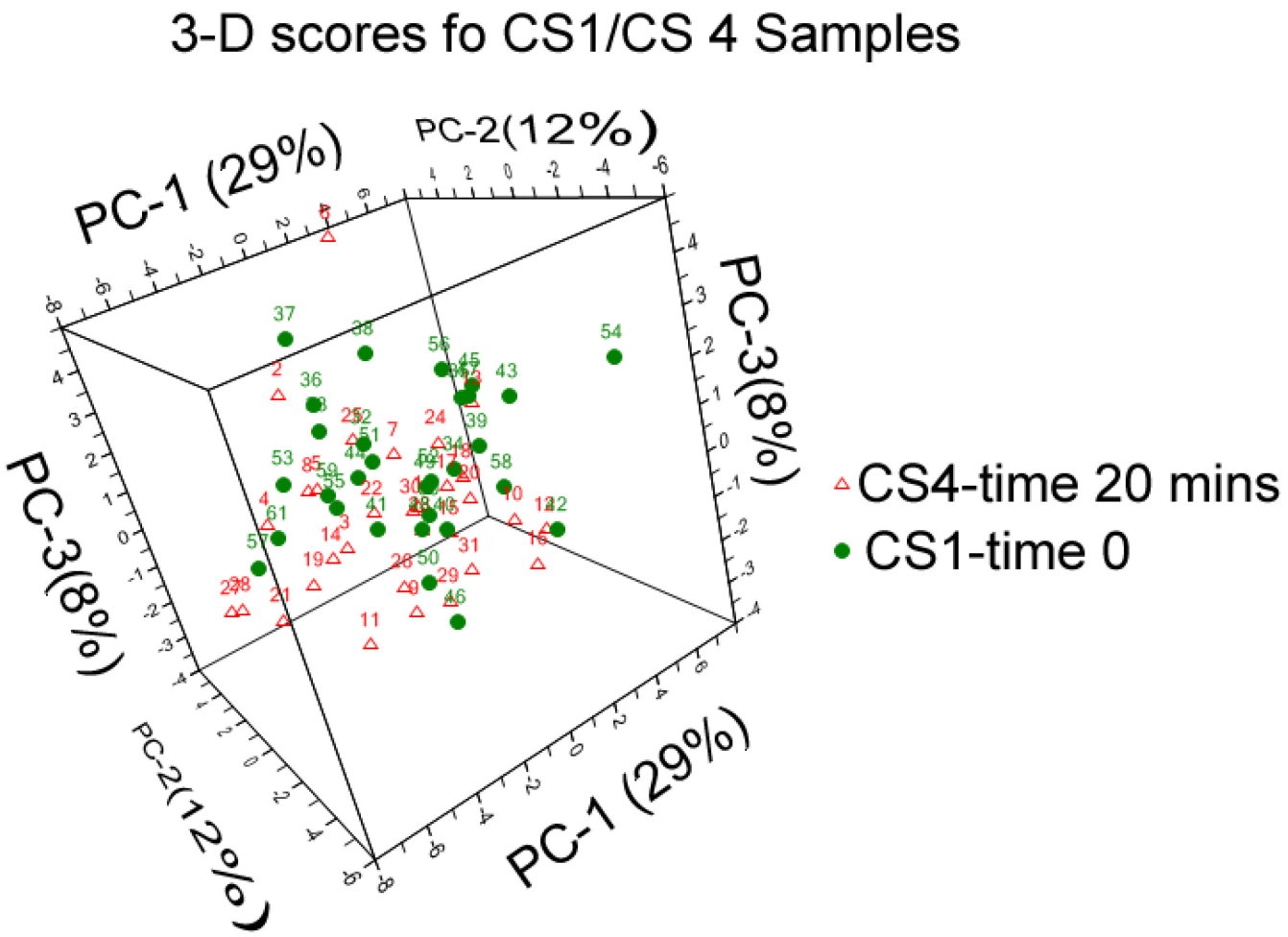




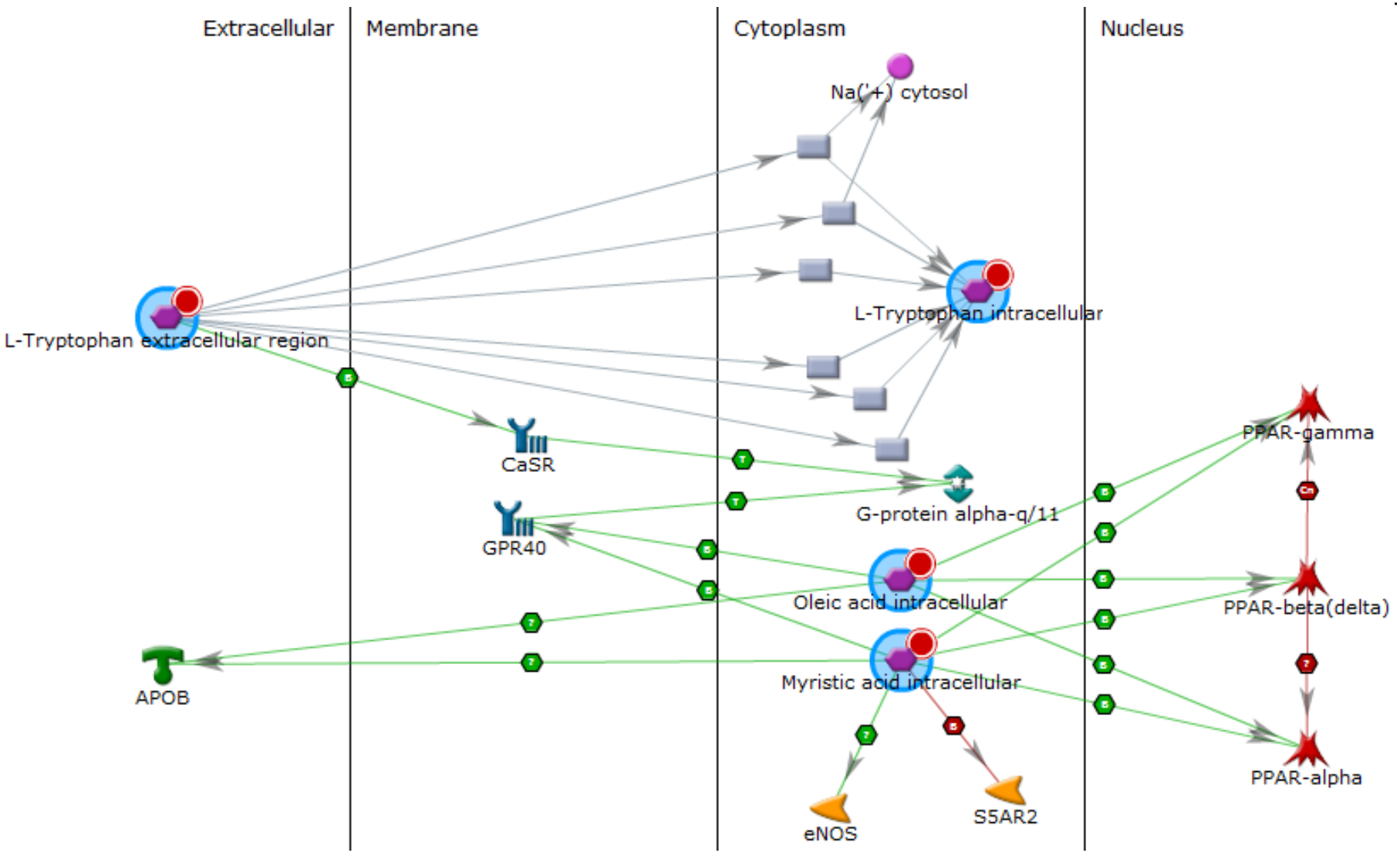
Hyaluronic Acid conjugated Si



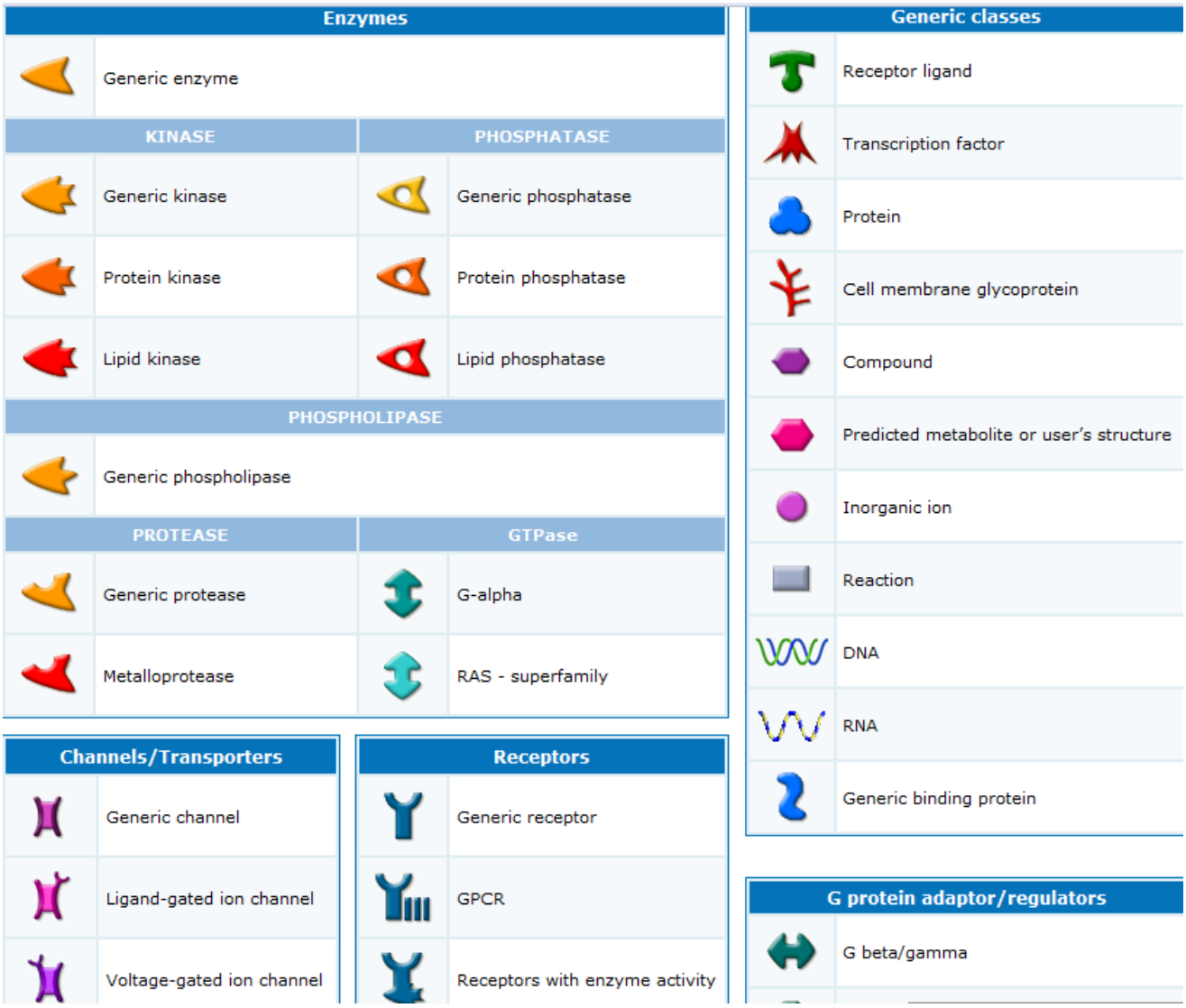

ATR Units
Ch2/CH3
Nh2
Ch2/CH3
Nh2
Ch2/CH3
Ch2/CH3
CooNa
Coo
Co
oh
Ch2/ch3
Co



Enlarged Figure 1


Extracellular
Membrane
Cytoplasm
Nucleus
Na(+) cytosol
L-Tryptophan intracellular
L-Tryptophan extracellular region
CaSR
G-protein alpha-q/11
GPR40
Oleic acid intracellular
Myristic acid intracellular
APOB
eNOS
S5AR2
PPAR-gamma
PPAR-beta(delta)
PPAR-alpha

Enlarged Figure 2.



Enlarged Figure 2 legend.