INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

Název: Spectroscopic and electrochemical characterization of the protein GP120

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Reg.č.projektu: CZ.1.07/2.4.00/31.0023

Název projektu: Partnerská síť centra excelentního bionanotechnologického výzkumu

Virus HIV

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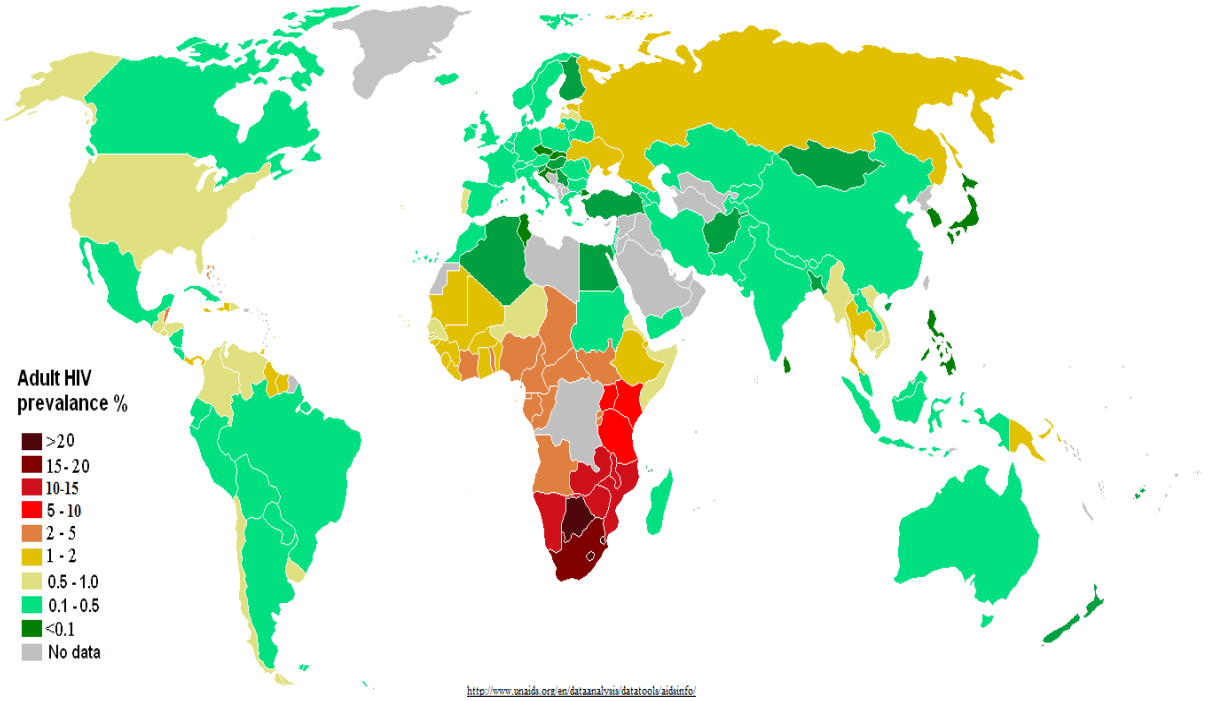
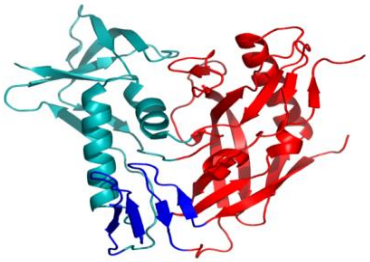


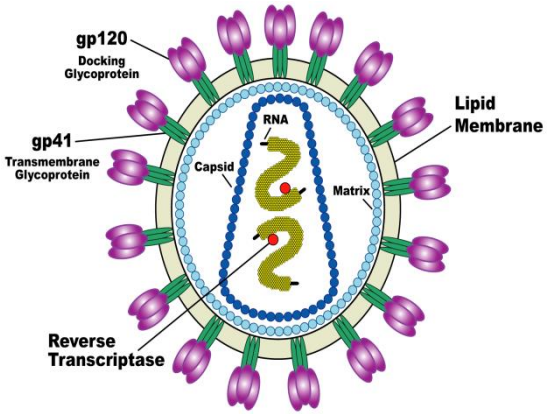
HIV (*Human Immunodeficiency Virus)* is an enveloped RNA virus belonging to retroviruses, a group of viruses having the ability to produce by their RNA and DNA sequence inserted into the host cell genome. HIV is not resistant. Outside the organism survives poorly and only for short periods. This virus is very particularly sensitive to heat, the temperature of 60 ° C will not survive. The virus could infect an organism must to penetrate and come into contact with the blood of susceptible individuals. The spread of the AIDS pandemic is one of the main problems of many developing countries. The world today is around **40 million infected**, three quarters of them live in sub-Saharan Africa. In some African countries is infected even a **quarter of the population**. Is also strongly affected by the **South Asia, especially India**. In Europe, the countries of the former Soviet Union. The largest number of HIV infected live in South Africa, Nigeria and India.

Protein GP 120



Glycoprotein GP120 is a glycoprotein exposed on the surface of the HIV envelope

The 120 in its name comes from its molecular weight of 120



HIV Virion-en-2

Gp120 is essential for virus entry into cells as it plays a vital role in attachment to specific cell surface receptors.

Detection of HIV

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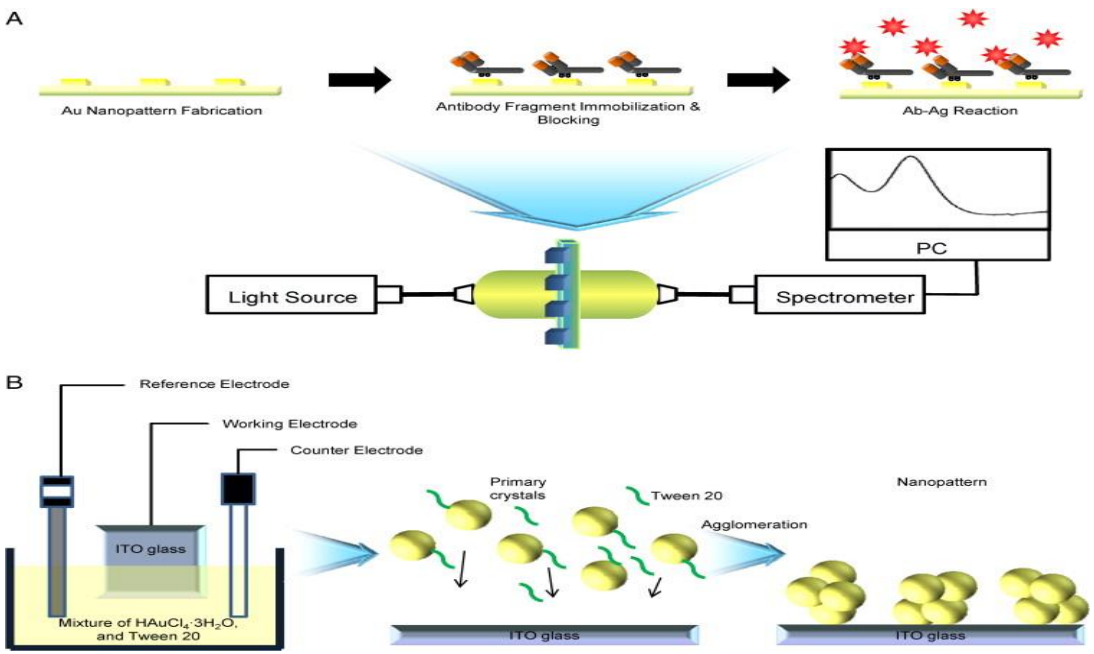

Schematic representation of (A) the immunoassay configuration with LSPR method for the quantitative detection of HIV-1 particles and of (B) Au nanopattern fabrication method based on electrochemical deposition in the presence of surfactant.

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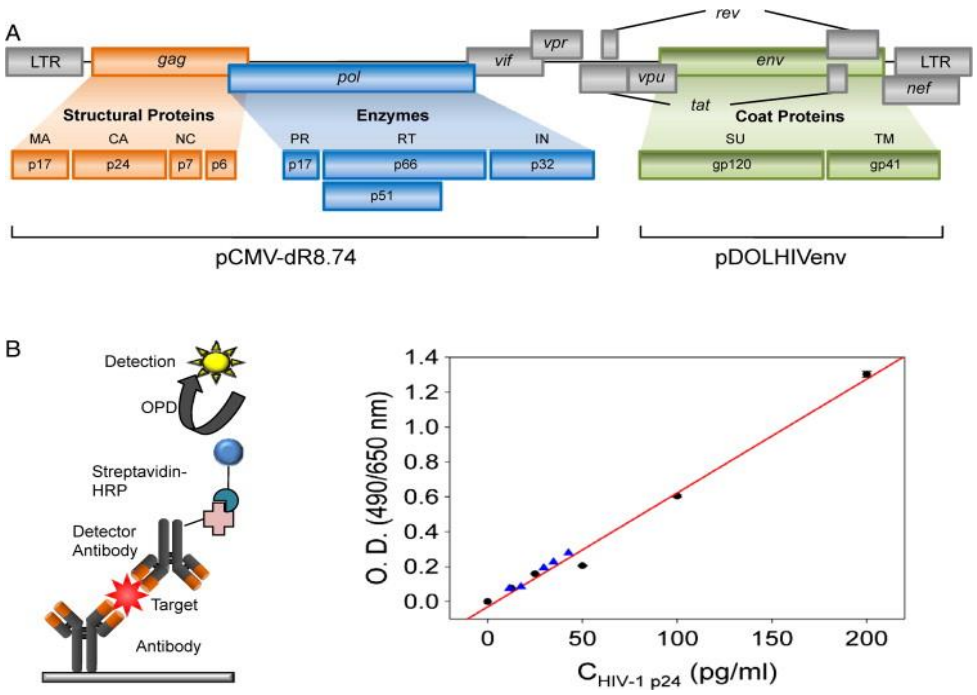
HIV-1 RNA genome structure and two different plasmids



(A) Representative HIV-1 RNA genome structure and two different plasmids, pCMV-dR8.74 and pDOLHIVenv consist of gag, pol, and env components. (B) The linear relationship between the O.D. value (490/650 nm) of standard HIV-1 p-24 antigen over the range 5-200 pg/mL with correlation coefficient (R2) is 0.9905 and the measured concentration of (▲) produced HIV-1 VLPs.

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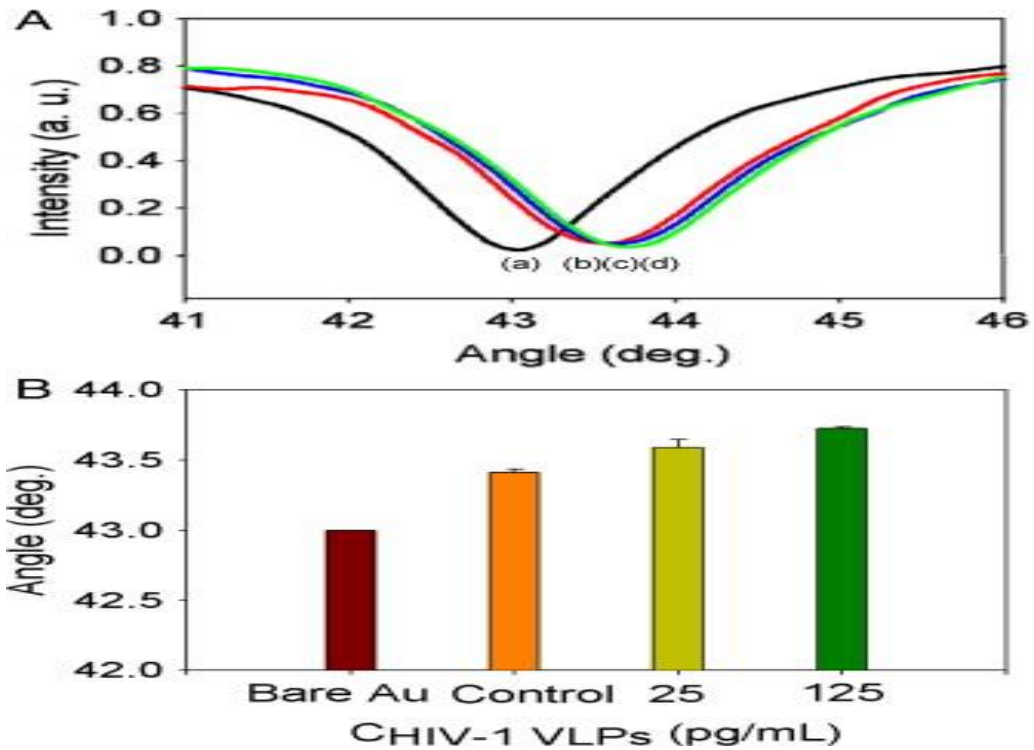
SPR(surface plasmon resonance spectroscopy



(A) Representative SPR spectra of the (a) Bare Au substrate, (b) antibody layer immobilized with antibody fragment and blocking material, (c) antigen (5 pg/mL of HIV-1 VLPs), (d) antigen (25 pg/mL of HIV-1 VLPs). (B) Plot of SPR(surface plasmon resonance spectroscopy) angle shift versus different layer.

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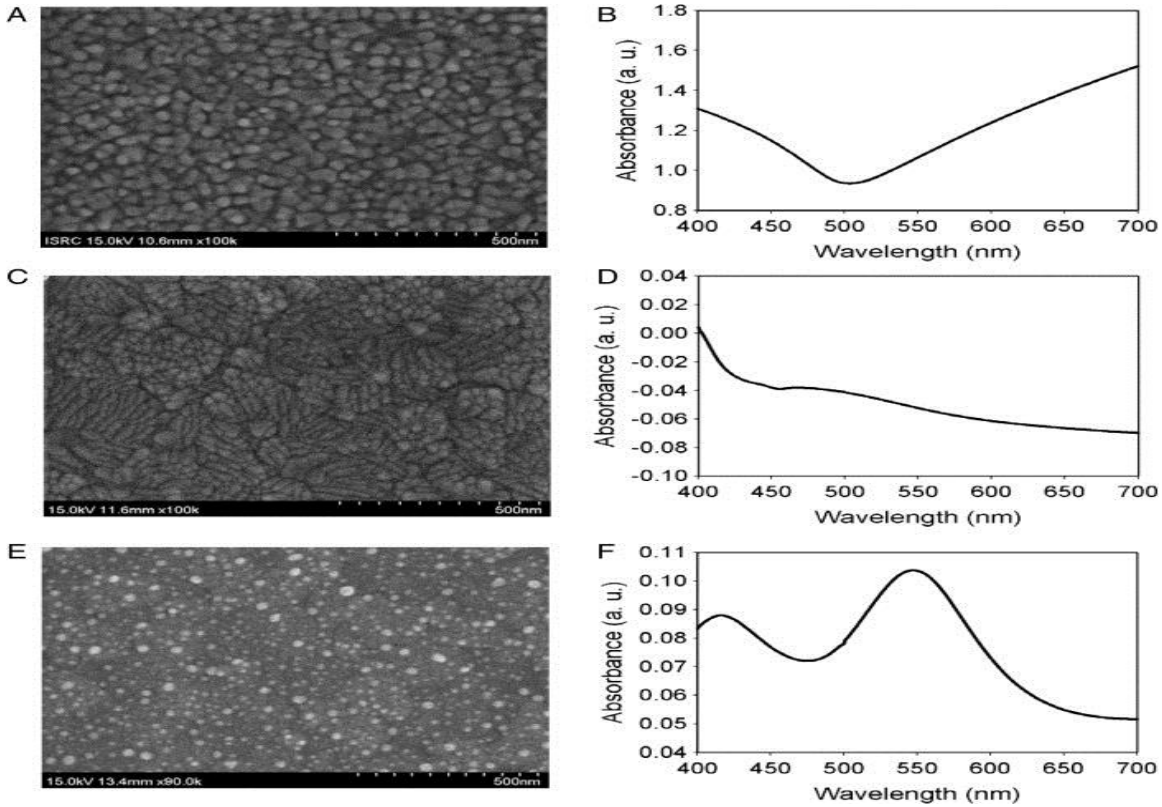
SEM image and absorption spectrum



SEM image of (A) thin Au film, (C) bare ITO substrate, (E) Au nanopattern on ITO substrate, and measured absorption spectrum of (B) thin Au film, (D) bare ITO substrate, (F) Au nanopattern on ITO.

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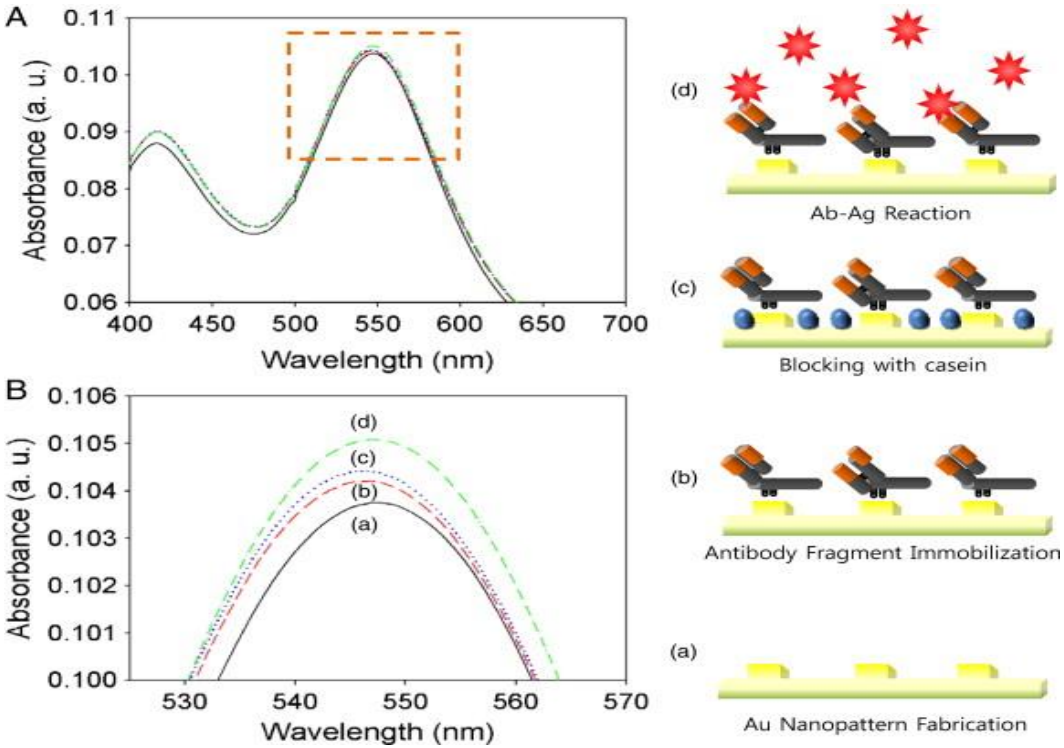
Quantitative analysis of HIV-1 VLPs from cell culture supernatant using LSPR



A) Optical characteristics of the (a) bare Au nanopattern on ITO substrate, (b) fragmented antibody immobilized layer, (c) blocking with casein, (d) HIV-1 VLPs immuno reacted layer, respectively. (**B**) Optical characteristics of zoomed part of wavelength between 520 to 570 nm.

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Poděkování

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Agronomická fakulta

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BRNO | CZECH REPUBLIC

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OP Vzdělávání pro konkurenceschopnost
INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

Thank you for your attention

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NanoBioMetalNet