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will be determined from X-ray Absorption Spectroscopy (XAS) measurements.

Surface properties of nanoparticles can drastically differ from the bulk. Elemental composition and chemical state of the surface atoms can be revealed with the X-ray Photoelectron Spectroscopy (XPS). This technique provides detailed information on composition and chemical state of the nanoparticle shell.

The size and shape of nanoparticles will be determined with the use of Atomic Force Microscopy (AFM) and Transmission Electron Microscopy (TEM). These techniques can provide spatial resolution in nanometer to Ångström range, e.g., corresponding to a size of single atoms.

Detailed nano-characteristics of surface and bulk of different nano-probes will provide a credible reference to clinical results and varying immune response patterns among patients.

C. Study Subjects

Approximately 25 subjects, 20 females and 5 males, age from 18 to 55 y.o. and respectable 10 control group subjects consisting 7 females and 3 males, will be enrolled to the study.

Patients with ACD will be recruited from Dermatology Departments of Medical Schools in Lausanne-Switzerland and Zabrze Rokitnica-Poland. They all will have previously confirmed positive patch skin reaction toward nickel sulfate 5.0% w/v in petrolatum. Patch testing

Patch test can be considered as biological provocation test and it can be postulated that locally induced skin symptoms like erythema, scaling and itching were considered as immune responses toward nickel sulfate in general and nickel-based nanoparticles in particular [7,8].

D. Patch Test Procedure

The study strips will be attached for 2 days and reactions will be examined on day 2 and day 3; negative (-) no visible reaction, questionable (?) erythema no infiltrations, follicular (f) only discrete follicular papules in the test area, weak (+) erythema infiltrations with possible slight papules, moderate (++) erythema infiltrations papules vesicles, strong (+++) erythema infiltrations with confluent vesicles. To compare the strengths of reactions, numerical values were allocated to

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