

THESIS ABSTRACT

As a university lecturer my research area during the last ten years covers a variety of subjects, the majority being related to the laboratory diagnosis in diabetes mellitus, oxidative stress and cardiovascular diseases. As a laboratory specialist working at the Department of Biochemistry and at private medical units offered me the possibility to coordinate clinical studies, projects and collaborate with colleagues from other medical fields. This experience could be useful in coordination of undergraduate, master and PhD students' activity. My main research areas are:

1. Evaluation of oxidative stress and antioxidant capacity

Our research team developed a photometric method for measurement of serum MDA concentration based on its reaction with TBA. Recently this procedure was adapted to HPLC. This improved methodology was also applied to saliva, correlations are promising. A project proposed by our team aiming the development and testing of this method obtained good results at a national competition, without being financed.

A few years ago the effect of a complex dietary supplement containing blueberry and sea buckthorn was tested by our research team on type 1 diabetic children. This product proved to have hypoglycemic and antioxidant effect based on the changes in C peptide concentration, HbA1c and the activity of two antioxidant enzymes: SOD, GPx. These research data open new perspectives in the phytotherapy of diabetic patients.

2. Study on factors that influence the accuracy of HbA1c measurement

This area was explored by me first working in Canada as a PhD student. After obtaining my doctorate degree I worked as a volunteer in the Central Laboratory of the Emergency County Hospital in Tîrgu Mureș on the Variant I analyzer, having the opportunity to continue my research in this field. I studied the incidence of persistent fetal hemoglobin especially in the diabetic population from our area, and the presence of pathological hemoglobin variants in these patients, which can cause interferences leading to inaccuracy of HbA1c measurement. The effect of incorrect storage and pipetting errors was also explored on analyzers based on chromatographic procedure.

3. Determination of arylsulfatase activity in different pathologies

We performed the investigation of the possible interference of arylsulfatase A activity with the sulfatide metabolism causing neurodegenerative diseases and

metabolic disorders. We determined the arylsulfatase A activity by photometric procedure based on hydrolysis of 4-nitrocatechol sulfate. Enzyme activity was significantly reduced in patients with Parkinson's disease, dementia, type 2 diabetes and repeated hemodialysis compared to the healthy control group. These changes could explain the role of this enzyme deficiency in the pathophysiology of diseases.

4. Screening programs in some forms of urogenital cancer in Mureș county

Our research team evaluated the efficacy of cervical cancer screening by Babeș-Papanicolau smear test in asymptomatic women aged 25-64 years. The screening was organized at the Emergency County Hospital in Tîrgu Mureș, we processed the data available from 2015. A small number of women were found having high-grade squamous intraepithelial lesions, for them early diagnosis and treatment is essential.

Males over 50 years are predisposed to prostate adenoma and cancer, so they were the target group for our screening made on patient living in Tîrgu Mureș and the surrounding rural areas. We revealed asymptomatic prostate cancer in 7 cases. Subjects with benign prostate hyperplasia were prescribed proper treatment for their condition.

5. Chemical analysis of urinary stones, favoring factors for urolithiasis

Urolithiasis is a frequent disease in our area, investigation of favoring conditions (low fluid intake, improper diet) is essential for prevention of recurrences. Urinary infection is frequent in these patients, major etiologic factor being E. coli. Calcium oxalate stones had the highest incidence in the studied patients, mixed chemical composition occurred very frequently.

6. Modern, complex investigation of hypertensive patients

We tested the role of cystatin C in early diagnosis of hypertensive nephropathy. We keep working on an ongoing project including evaluation of oxidative stress and the severity of microvascular complications in hypertensive patients with/without cognitive impairment and interpretation in relationship with other parameters.

7. PM2.5 level measurement in the UMPH Tîrgu Mureș campus

Air quality was measured in the central building of our university and in four student dormitories, before and after the law nr. 15/2016. PM2.5 levels were significantly lower after the new legislation in all locations tested, which means that exposure to passive smoking in the campus decreased.