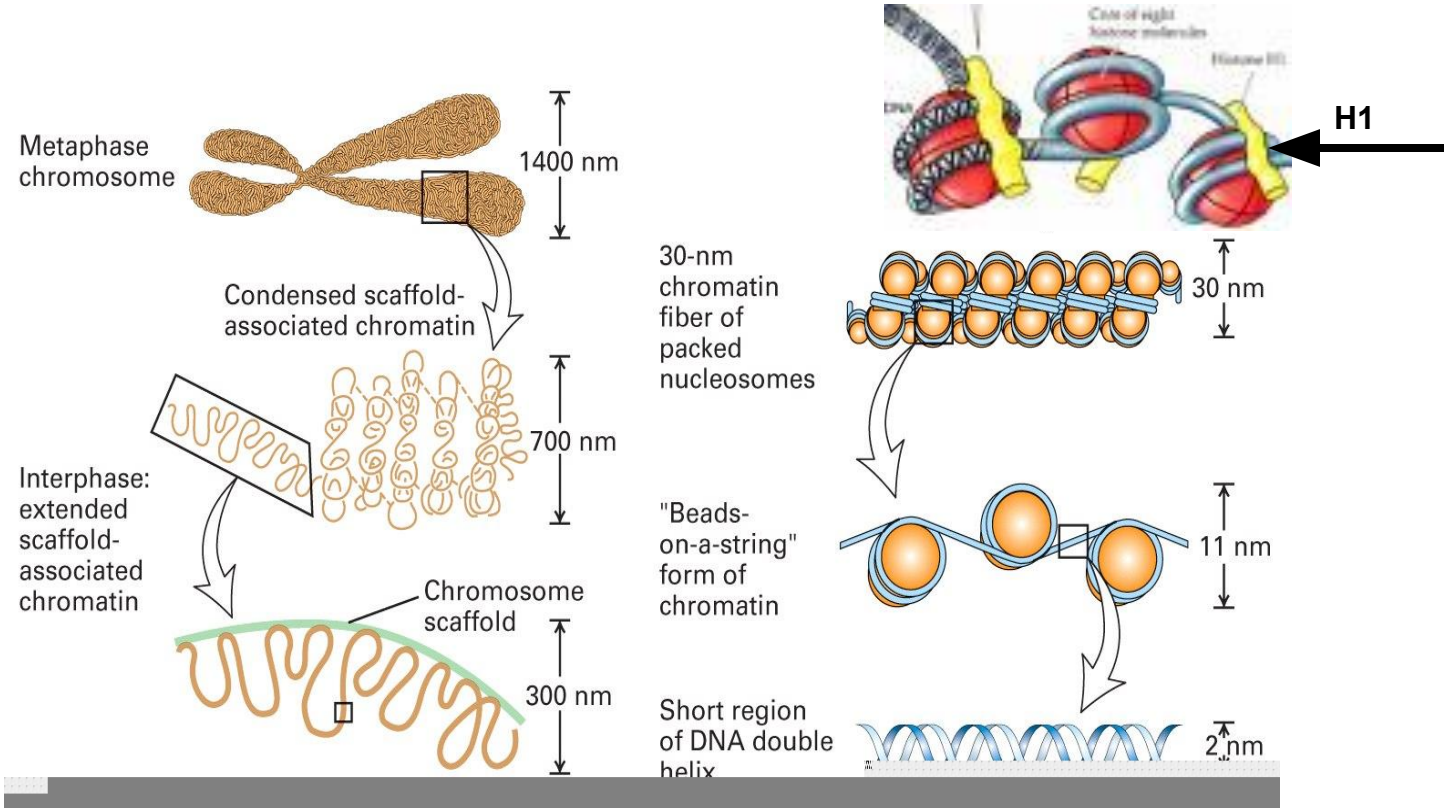
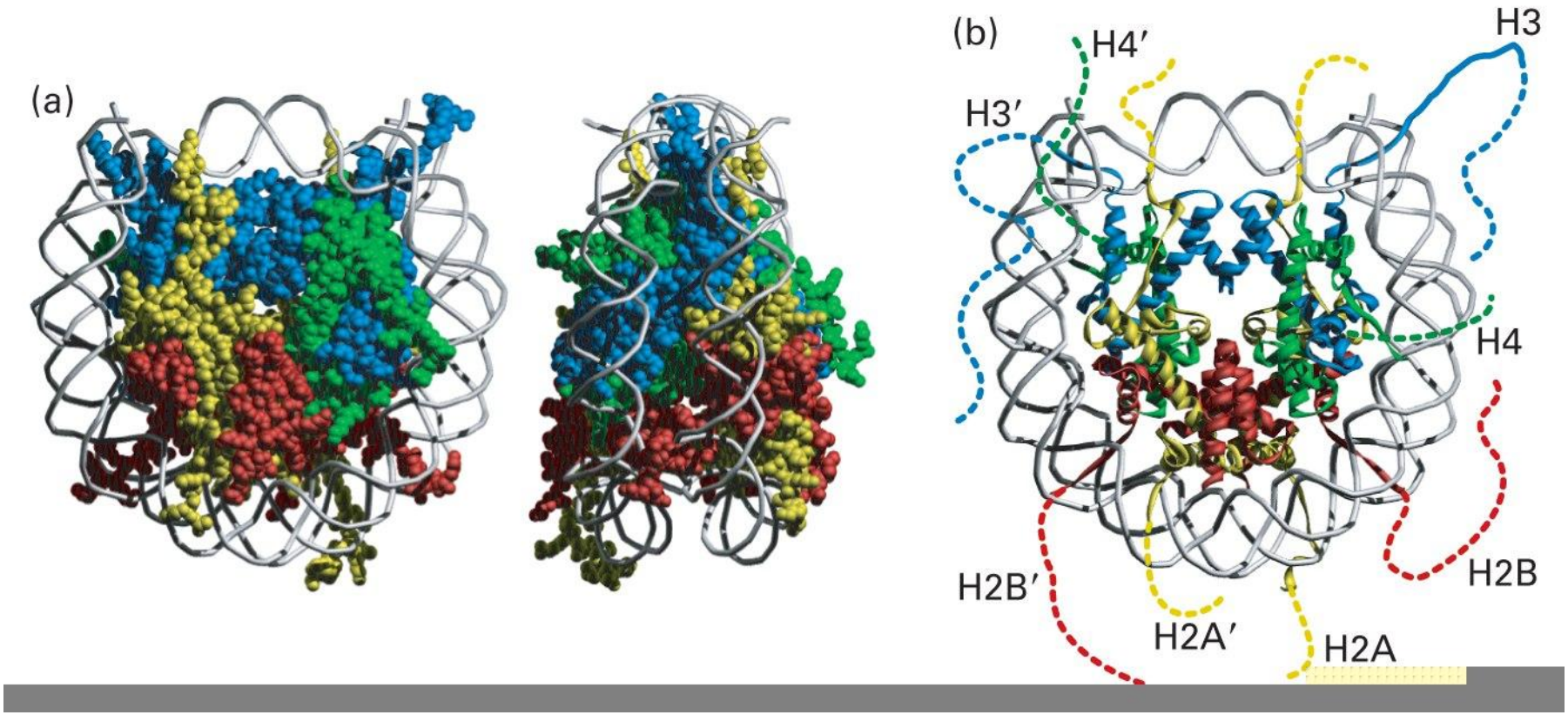
Andronikashvili Institute of Physics

Department of Physics of Biological Systems

nelly_sapojnikova@hotmail.com





Ac-Leu-Ala-His-Tyr-Asn-Lys-Amid (80-85 fragment of H2B) Cu(II) and Ni(II)

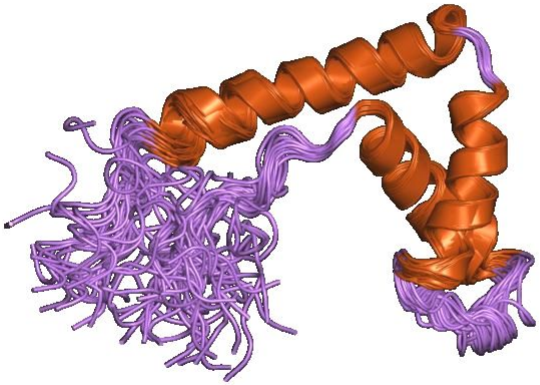
Ac-Thr-Tyr-Thr-Glu-His-Ala-Amid (71-76 fragment of H4) Ni(II)

Ac-Glu-Ser-His-His-Amid (C-terminus fragment of H2A) Cu(II) and Ni(II)

Zinc is a novel intracellular second messenger like Ca^{2+} and cAMP

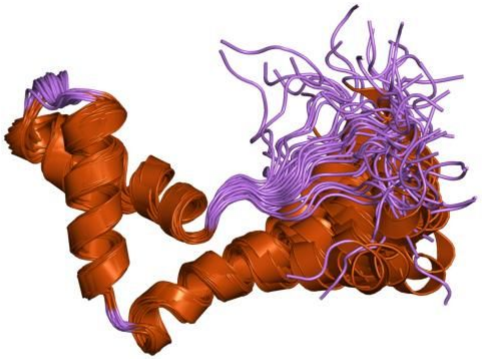
The double life of HMGB1 chromatin protein: Architectural factor and extracellular signal

HMGB1 is ubiquitous and only 10 times less abundant than core histones.



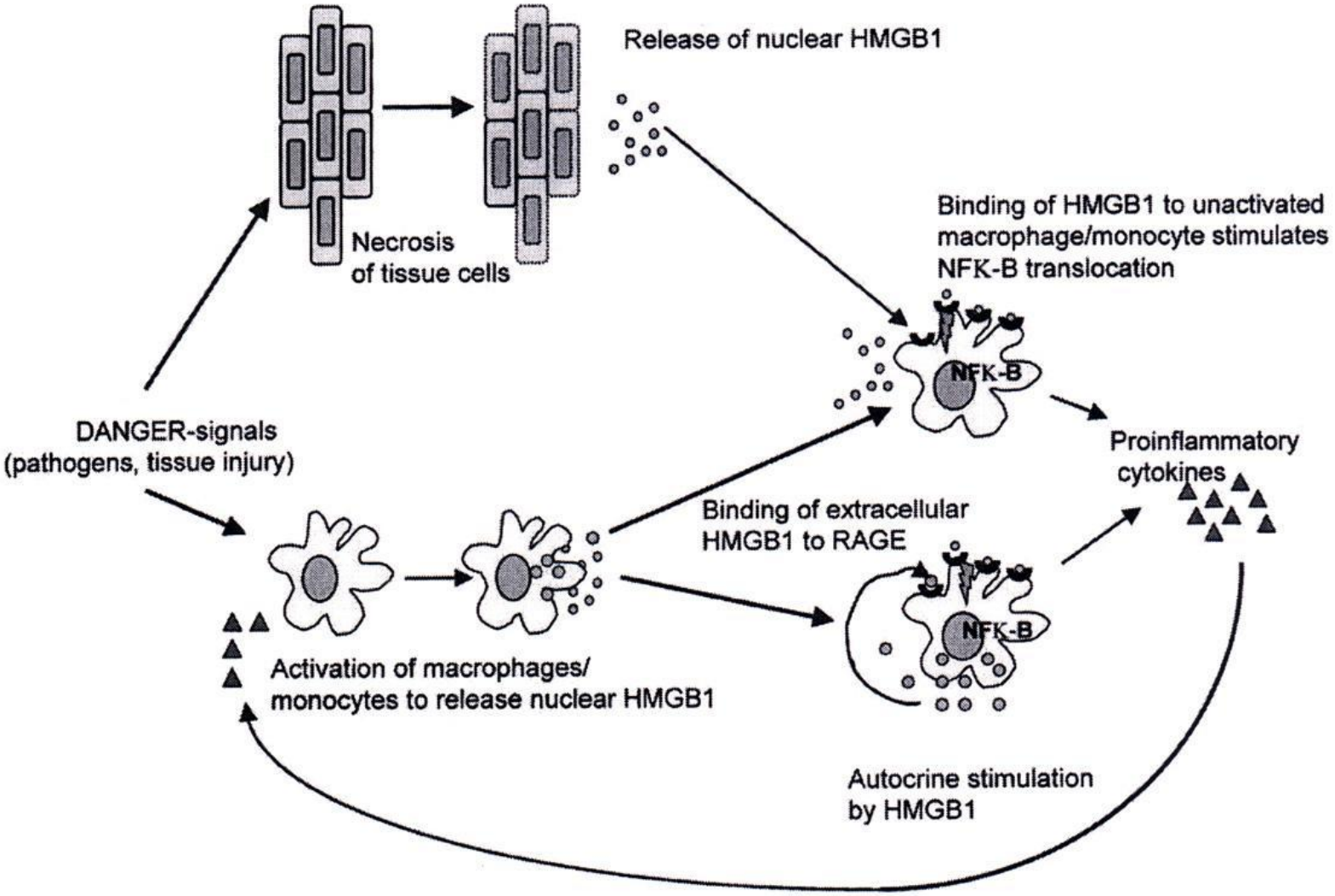
HMGB1 Box A

The A Box antagonizes HMGB1- induced inflammation



HMGB1 Box B

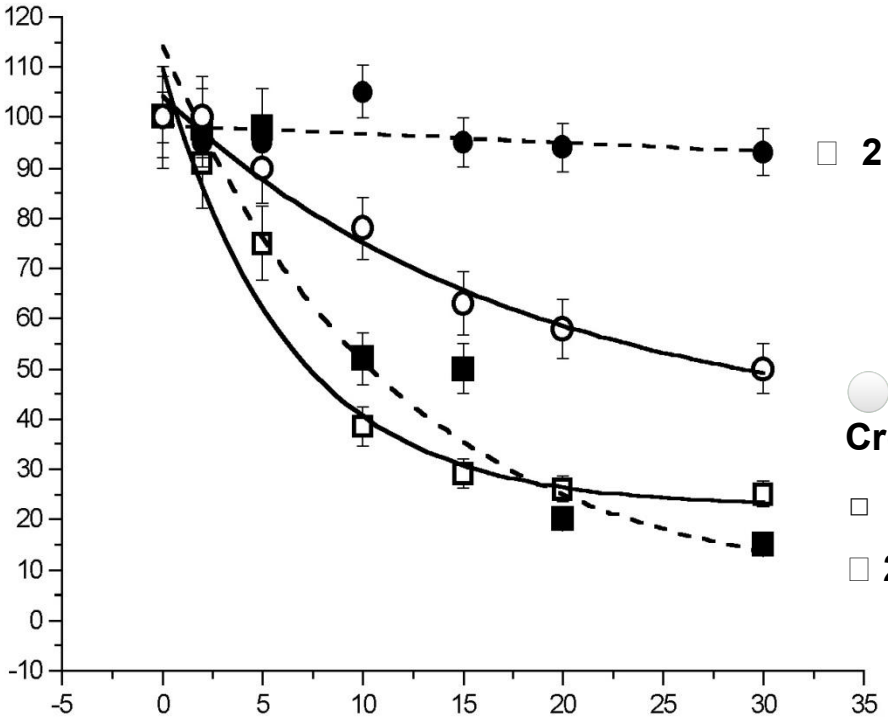
The cytokine-inducing activity resides in the B Box domain



Schematic illustration of potential pathways for HMGB1 release leading to inflammatory responses. HMGB1 can be exracellularly released by passive secretion from any necrotic cell or by active secretion from activated macrophages/monocytes.

HMGB1 and diseases: Sepsis; Lung inflammation; Arthritis; Ischemic stroke; Tuberculosis -Mycobacterial infection induces the secretion of high-mobility group box 1 protein

Bactericidal activity of HMGB1 - functionally belongs to the growing family of antibiotic peptides (Box A???)

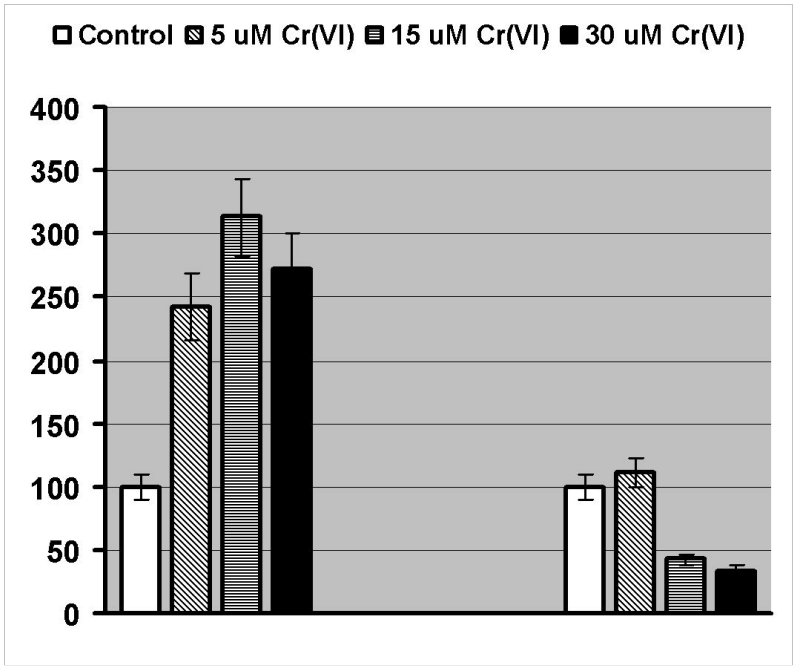


Dr Marina Abuladze

Time- and dose-dependent Cr(VI)-induced cytotoxicity by Cr(VI). Fetal human lung fibroblasts were grown up to 80% confluency prior to chromium treatment at the concentration range from 2-30 (μM).

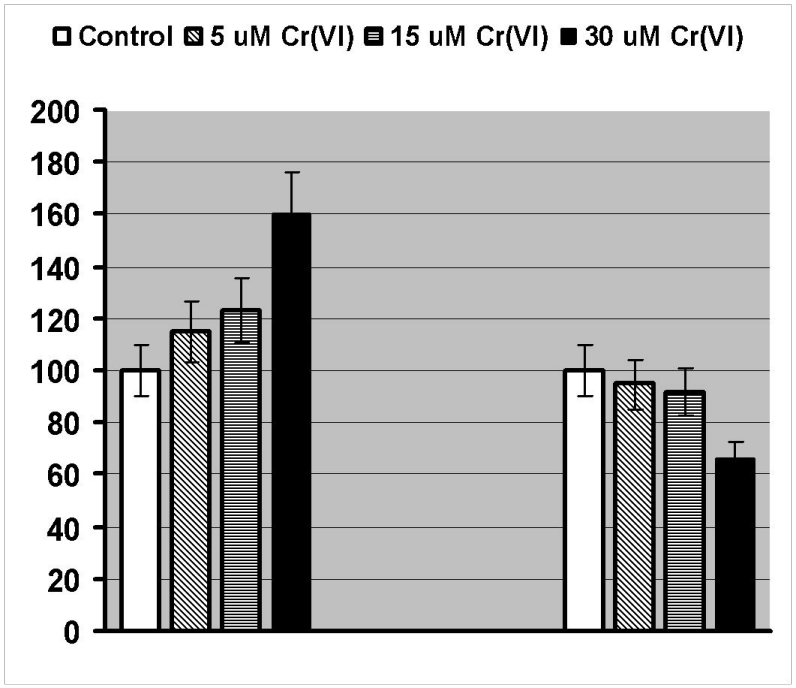
A

ROS (DCFH-DA)

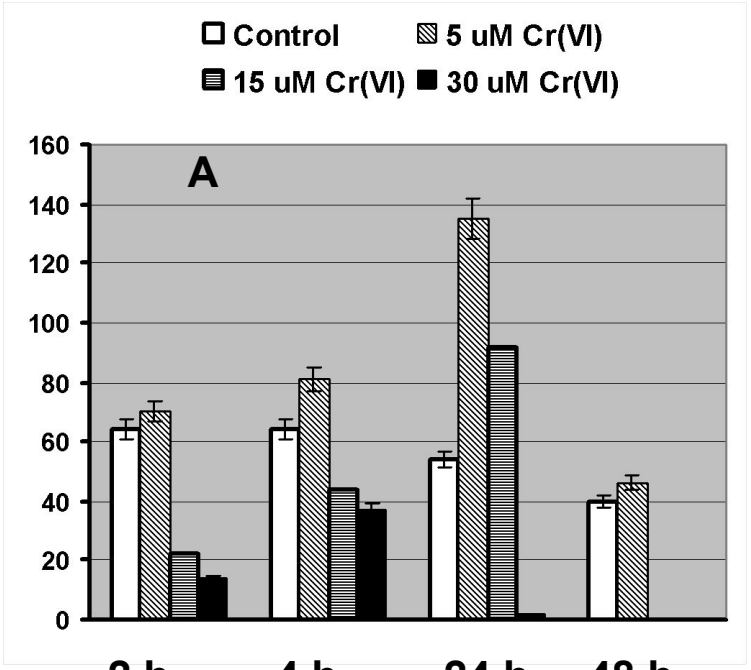


B

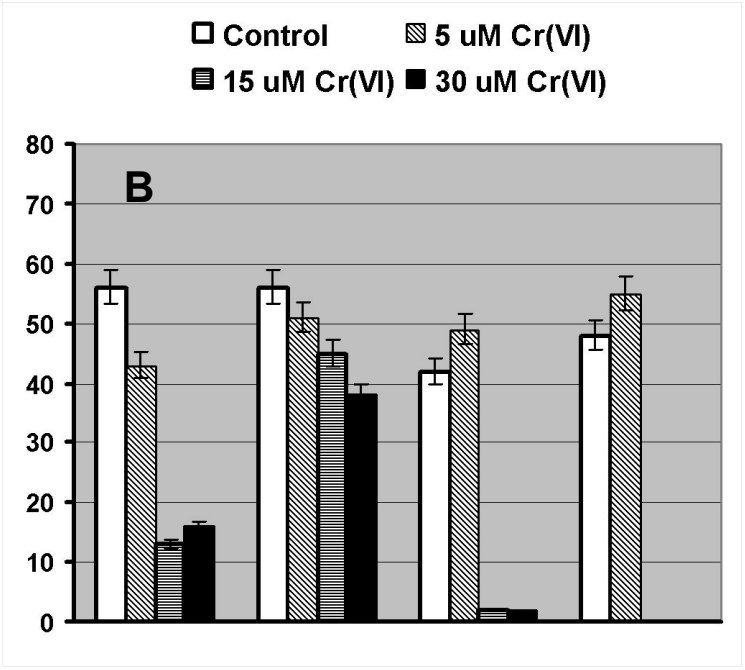
ROS (DHE)



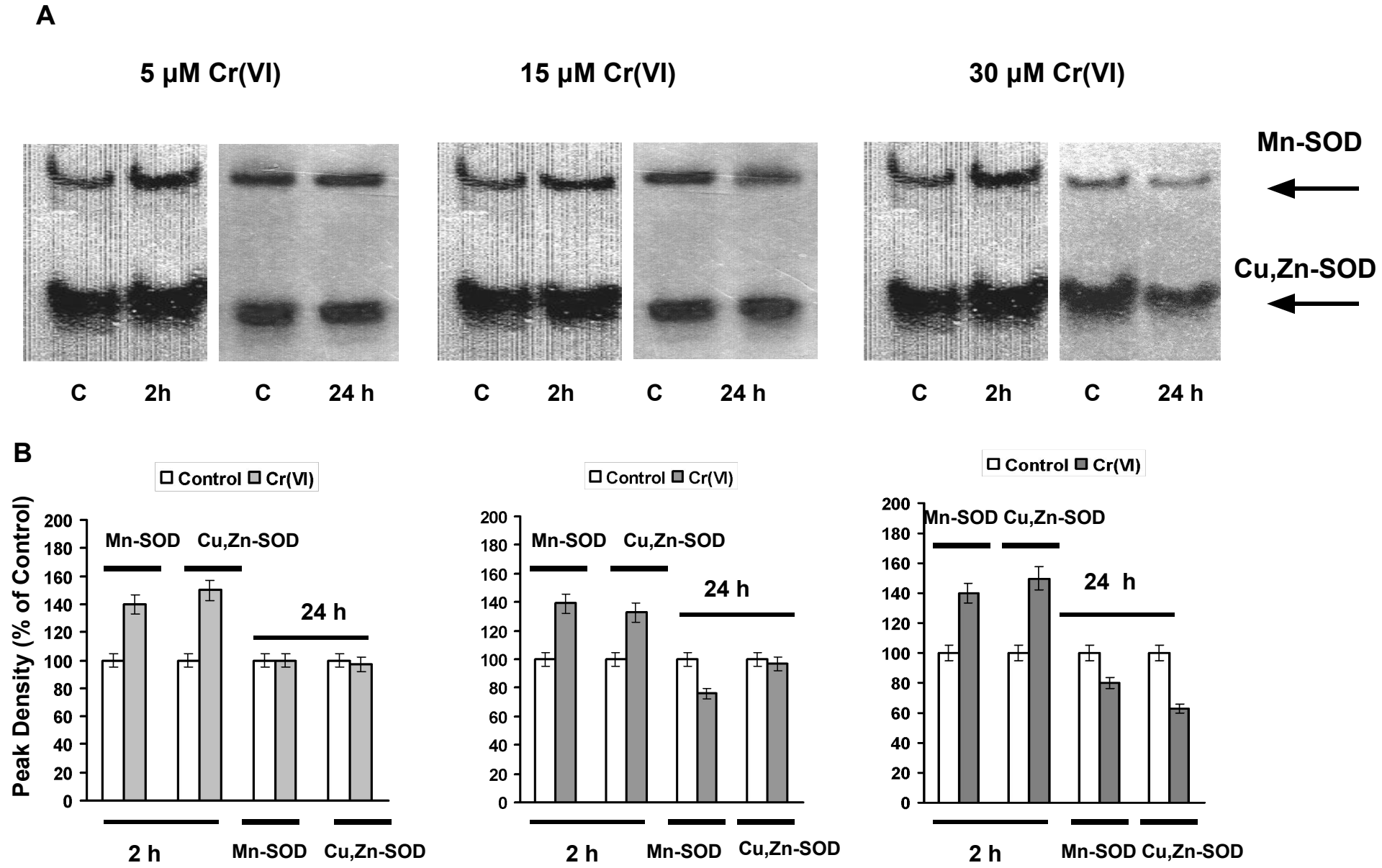
ROS level in control untreated and Cr(VI)-treated HLF cells

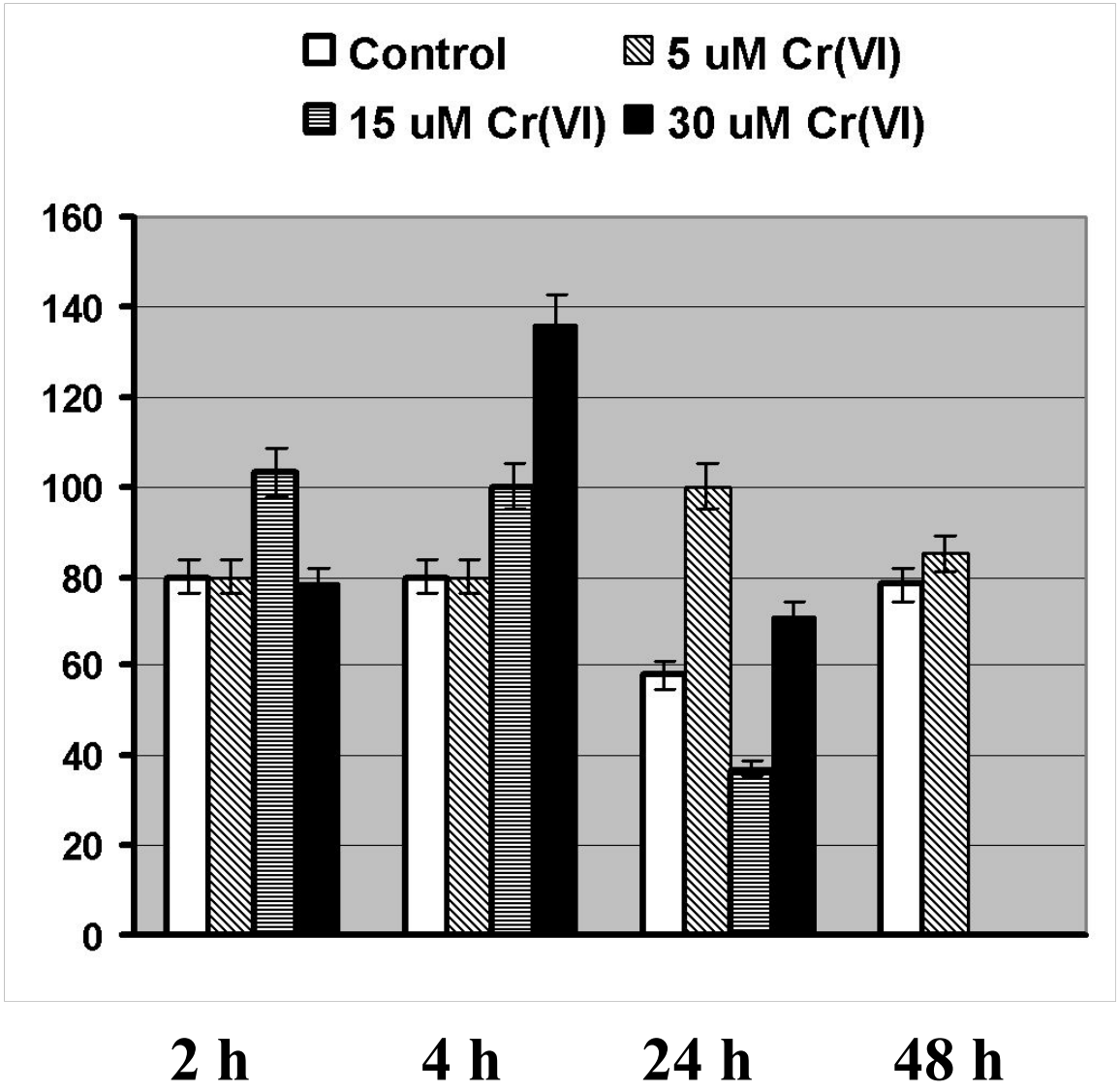


Dr Nino Asatiani

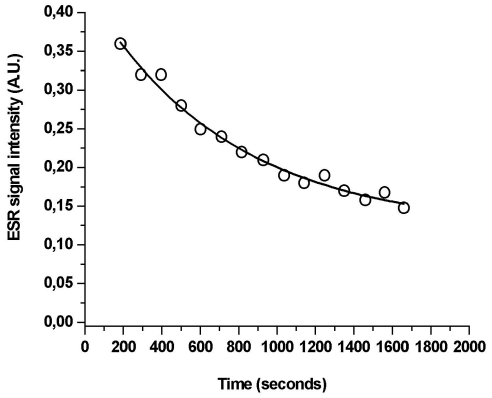


SOD catalyzes $O_2^{\cdot -}$ dismutation to H_2O_2

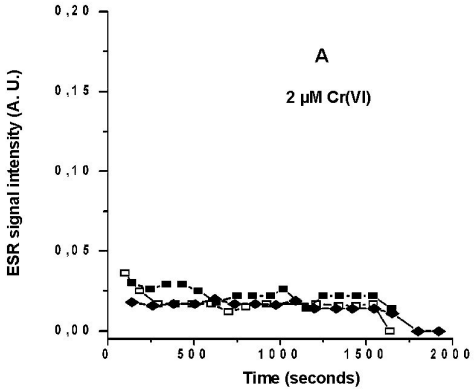


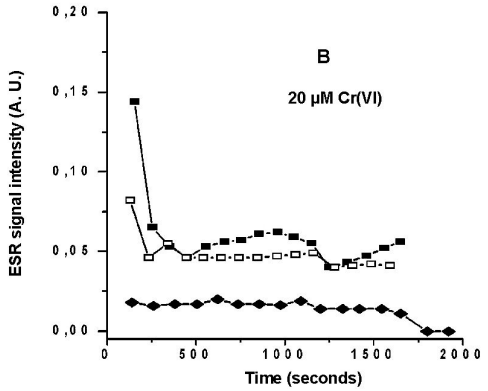


Dr Tamar Kartvelishvili



The time course of the ESR signal intensity in the model Fenton reaction. The model Fenton reaction mixture contained 100 mM DMPO, 1 mM $FeSO_4$, 100 mM H_2O_2, 50 mM sodium/potassium buffer pH 7.4 in a final volume 62.5 µl.





The time course of the ESR signal intensity in the model Fenton reaction in the presence of crude cell extracts of Cr(VI)-treated and untreated control L-41 cells. (A) - 2 µM Cr(VI) treatment; (B) - 20 µM Cr(VI) treatment. ◆- Control; □ - 24 h of the cell growth under Cr(VI) action; □ - 48 h of the cell growth under Cr(VI) action. Cr(VI) as potassium chromate was added to the cell culture at the 48 h of growth (80% of confluence).

Protein concentration in ESR sample was 0.168 mg/ml.

Study of the antioxidant system status and blood metalloproteinases cross influence at acute ischemic stroke

Recently much research interest is focused on predictors of functional outcome in stroke. The development of early prognostic biochemical parameters is of great importance. Accumulating data suggest that MMPs have a deleterious role in stroke. The hypothesis to be tested in this project is that the profile of plasma matrix metalloproteinases **MMP-2, MMP-9 and MMP-12** is changed (elevated) during the hyperacute stage of the disease, and it provides prognostic information for stroke severity, especially malignant middle cerebral artery infarct along with other inflammatory markers (plasma status of antioxidant defense system).

1.To assess quantitatively the level of **MMP-2, MMP-9 and MMP-12** in the blood plasma of stroke patients in the first 24 hours after stroke.

2. To estimate the **oxidant/antioxidant balance** in the blood plasma of patients and healthy volunteers and develop it as the marker of the disease.

3. To measure the blood level of extracellular cytokine **HMGB1** as the possible factor upregulating MMPs in human stroke.

4. To estimate the predictive role of the above-mentioned serological markers in development of malignant cerebral infarcts.

5. To estimate the predictive role of the above-mentioned serological markers in functional outcome after IS.

3D Structure of MMP structures - ProMMP-2-TIMP-2 complex.

Orange - propeptide

Green - catalitic domail

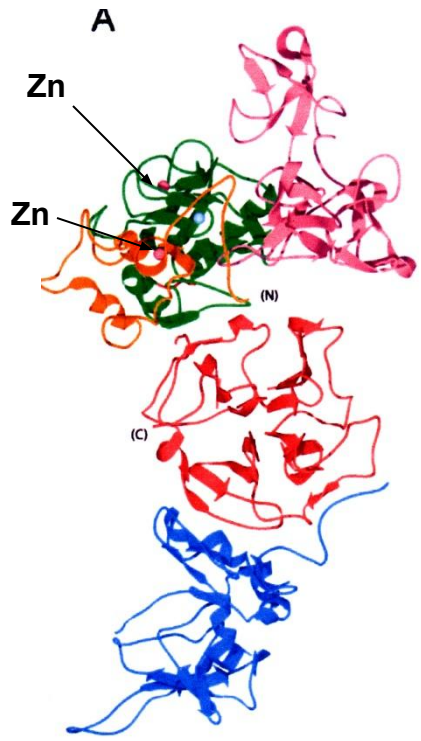
Pink -fibronectin domain

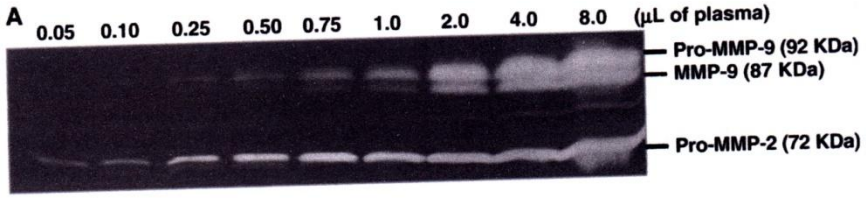
Blue - TIMP-2

One catalitic Zn;

one structural Zn;

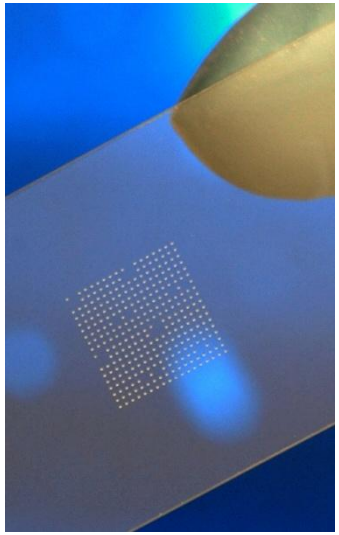
Three calcium ions





Биочипы как диагностическое средство для быстрого скрининга болезнетворных бактерий и вирусов (кишечный тракт, уро-репродуктивный тракт)

Микрочип - это пластинка, покрытая тонким слоем фиксирующего нейтрального вещества (например модифицированного акриламида), в которое в совершенно определенной последовательности нанесены фрагменты ДНК (олигонуклеотиды), специфически сконструированные и синтезированные для диагностики.



- **Нуклеиновые кислоты (из ассоциированных со слизистой облочкой СРБ из биопсийного материала в случае больных ЯК и из крови в случае анализа TORCH-инфекции) выделяются и метятся флуоресцентными метками**

Какой новый продукт / услуга предлагается?

1) микрочип-ЯК для быстрой и достоверной диагностики бактериального происхождения язвенных колитов (ЯК) и для наблюдения за проходящим курсом лечения антибиотиками;

Больные и здоровые люди являются носителями сульфат редуцирующих бактерий (СРБ), однако профиль бактериальных популяций обнаруживает поразительное различие.

АНАЛОГА НЕТ

Какой новый продукт / услуга предлагается?

2) микрочип-TORCH, который позволят с малыми затратами, быстро провести мониторинг TORCH-инфекции на первых месяцах беременности. Этот мониторинг может стать повсеместным необходимым и обязательным анализом.

TORCH-инфекция - это комплекс инфекций: Toxoplasma Gondii, Rubella, Cytomegalovirus, Chlamidia trachomatis, Herpes virus

Для мониторинга TORCH-инфекции, существует два диагностических метода