

The blood is the fluid transported in the vascular system of the body. It is made up of plasma, cells, gasses, minerals, proteins, hormones and more. The blood delivers nutrients and oxygen to cells and carries waste products and carbon dioxide away from them.

The blood may be seen as a window into some of the physiologic non-thermal effects of EMF. There are changes in the structures and functions of many cell types (and their organelles) as well as the quality and quantity of substances carried in the plasma.

There are probably a number of mechanisms involved in these EMF effects, (most of which are the subjects of other maps):

free radical injury and tissue responses, NO/ONOO cycle effects
 shifting of methylation and glutathione cycles
 abnormal hormonal cascades of many kinds
 mitochondrial oxidative stress cascade
 alteration of membrane/receptor functions
 changes in morphology and/or behavior of cells
 alterations in behavior of interfacial water molecules

This map presents an overview of some the limited research available on EMF effects on the blood cells and other components.

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EMF EFFECTS

BLOOD FACTORS

- Ferritin decreased
- Histamine levels increased
- Homocysteine increased
- Hepatic enzymes increased
- Increased serum glucose

HORMONES

- Insulin levels altered
- Serum cortisol increased
- Melatonin decreased
- Decreased progesterone
- Decreased estrogen
- TSH and thyroid hormones

BLOOD PROPERTIES

- Rouleau formation
- Adhesion changed
- Repair of cells slows
- Viscosity increased
- Osmotic fragility decreased
- Intracellular conformation changes

BLOOD COMPONENTS

CELLS AND CONTENTS

- Red blood cells
- White blood cells
- Platelets
- Hemoglobin
- Glycosylated hemoglobin

PLASMA COMPONENTS

- Glucose
- Calcium
- Magnesium
- Electrolytes
- Hepatic enzymes
- Antibodies
- Proteins and routine biomarkers
- Tissue injury markers
- Free hormones, protein carriers
- Vitamins and metabolites
- Lipids and lipoproteins

BIOINITIATIVE REPORT:

- GENOTOXIC EFFECTS
- EFFECTS ON MELATONIN
- EFFECTS ON IMMUNE FUNCTION
- CHILDHOOD CANCERS (LEUKEMIA)
- GENE AND PROTEIN EXPRESSION

EMF, BLOOD CELLS AND CARRIED COMPONENTS

Studies: Cells

- [RF, RBC rouleau](#)
- [RF, lymphocyte functions](#)
- [ELF lymphocyte chromatin](#)
- [ELMF, RBC oxidative stress](#)
- [RF, lymphocyte repair altered](#)
- [RF, leukocyte mobility changes](#)
- [RF, erythrocyte shape changes](#)
- [RF, monocyte adhesion changes](#)
- [RF, lymphocytes, caspase induction](#)
- [RF, lymphocytes, adaptive response](#)
- [RF, decrease in multiple cell types](#)
- [RF, lymphocyte organelle destruction](#)
- [RF, polarized EMF, erythrocyte rouleau](#)
- Shape of RBC affects e-field from EMF
- [HF-EF, deformability and stability of RBCs](#)
- [RF, blood parameter changes, RBCs serrated](#)
- [RF, lymphocytes, adaptive response, cell cycle](#)
- [ELF, micronucleated polychromatic RBCs, mice](#)
- [RF, oxi-stress, apoptosis, mononuclear leukocyte](#)

Studies: Plasma

- [RF, ferritin decreases](#)
- [Grounding, physiologic changes](#)
- [ELF, workers, hematologic changes](#)
- [RF, multiple hematologic changes](#)
- [ELF, workers, cardiovascular markers](#)
- [RF, mobile phones, rats, blood properties](#)

Studies: Glucose

- [EMF, treadmills, glucose](#)
- [Article: earthing and glucose](#)
- [MF, decreased insulin response to glucose](#)

Studies: Hormones

- [RF, melatonin release](#)
- [RF, male hormone effects](#)
- [ELF, rats, female hormones](#)
- [RF, melatonin, testosterone](#)
- [ELF, male hormone changes](#)
- [ELF MF, dentists, serum cortisol](#)
- ★ [MW, change in serotonin level](#)
- [RF, hamsters, hormonal changes](#)
- [EMF, histamine, heat shock proteins](#)
- [RF, rats, decreased thyroid hormones](#)
- [RF, male, follicle stimulating hormone](#)
- [EMR, medical workers, stress hormones](#)
- ★ [MW, mice, change in glucocorticoid level](#)
- [RF, base stations, adrenal-pituitary axis affects](#)



Hematopo. tissue

- [Adult Leukemia and EMF](#)
- [RF, bone marrow toxicity](#)
- [RF, cell proliferation, differentiation](#)
- ★ [RF, hematopoietic malignancies](#)
- ★ [ELF-EMF, erythro-leukemic changes](#)

CBC, WBC Differential

- ★ [Incr. RBC, Shift WBC](#)

Platelets

- ★ [MW, platelet aggregation](#)
- ★ [MW, platelet oxygen metabolism](#)

Other

- [Vasodilatory reserve and RF](#)
- [Decreased O2 affinity of Hb, RF](#)
- ★ [MW, literature review of effects](#)
- ★ [EMF, accuracy of glucose monitors](#)

Home: [Oscillatorium](#)
 Newest version [this map](#)
 Date of this update: 07-25-15

ARTICLES:

- ★ [EMF AND CHANGES IN CBC](#)
- [SHORT TERM CELL PHONE, BLOOD](#)
- [EHS PHYSIOLOGICALLY EXPLAINED](#)
- [BLOOD TESTS TO THWART TOWER?](#)

