



Research project:

Influence of high frequency EMF on biological systems

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Duration: April 1993 – August 1993

Objective

- Setup of a 890 - 915 MHz exposure system and fabrication of a rectangular waveguide
- Investigation of effects of 15 hours or 4 weeks exposures on bacteria, viruses, free DNA, and proteins. Search for potential influences of RF EMF on DNA, causing malignant changes in cells.

Results

- No influence on growth- and reverse mutation rates (spontaneous reduction of mutations) of bacteria
- In a few experiments slight decrease of the survival rate of the T4-bacteriophages (not reproducible)
- Influence on the restriction pattern of exposed DNA (cleavage of DNA fragments); possibly caused by contamination of the samples
- No changes observed in β -galactosidase activity

Exposure

Exposure parameter	
Signal source	Mobile phone
Carrier frequency	890-915 MHz
Modulation	Mixed modulation test mode "send"-cont. operation
Power	8 W _{burst} (1 W _{mean})
Duration of exposure	15 h or 4 weeks



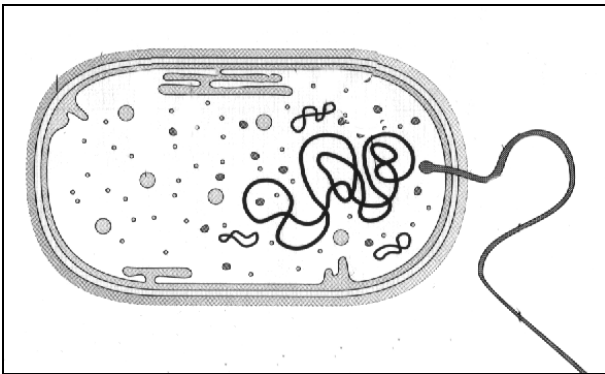
Experiments on bacteria and viruses

Object

- Bacteria cultures
- Viruses (T4-bacteriophages)

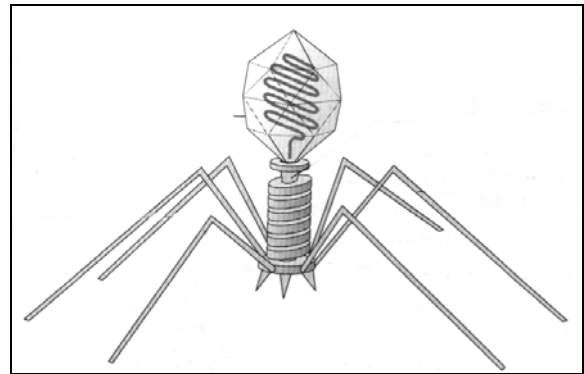
Investigation parameters

- Determination of the growth- and reverse mutation rates of the bacteria
Duration of exposure: 15 hours
- Determination of phage survival rate
Duration of exposure: 4 weeks



Bacterium

- double stranded DNA (D)
- plasmid DNA (P)



T4- bacteriophage

- head with double stranded, densely packed DNA; (encodes about 200 genes)
- viral coat built from proteins

Experiments on free DNA and Proteins

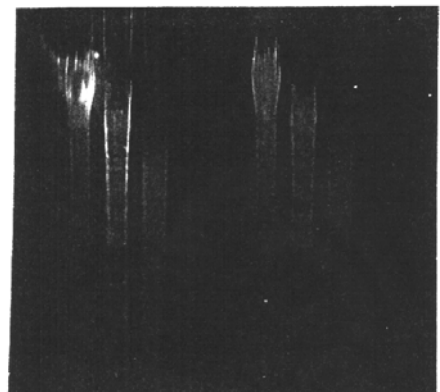
Object

- Free DNA molecules
- Proteins (β -galactosidase)

Investigation parameters

- Evidence of structural changes of DNA by transcription- and restriction experiments (gel electrophoresis)
Duration of exposure: 4 weeks
- Determination of β -galactosidase activity
Duration of exposure: 4 weeks

1 2 3 1 2 3



Restriction pattern of the investigated DNA

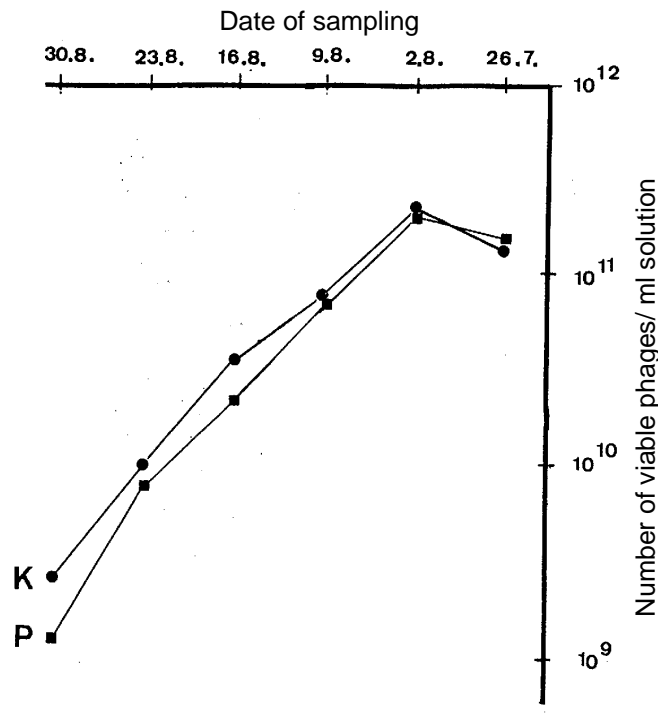
1: control DNA, 37°C

2: control DNA, 4°C

3: exposed DNA, 37°C

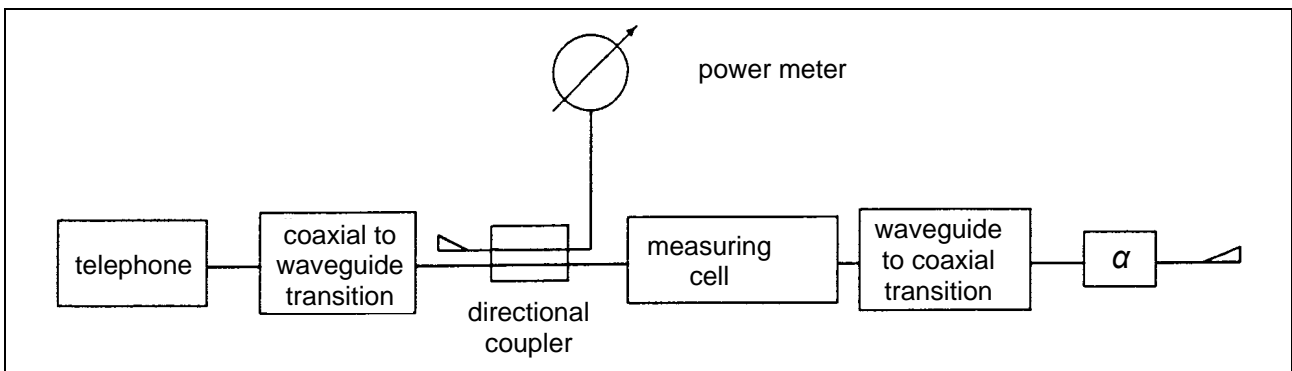


Survival rates of the bacteriophages (exposed (P), control (K))



- In case of damage of the bacteriophages a reduced survival rate of some orders of magnitude would be expected

RF-Exposure system



- Carrier frequency 890 - 915 MHz
- H10 - rectangular waveguide (standardized profile R9)

Publication

„DNA and protein exposed to modulated frequency radiation.“

Rüger, W. 1996:

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