Dr. habil. Anna Salek

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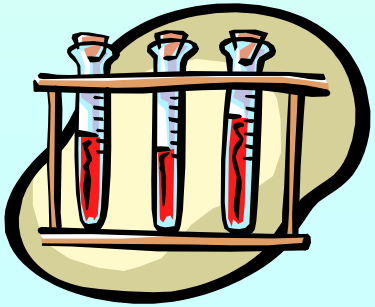
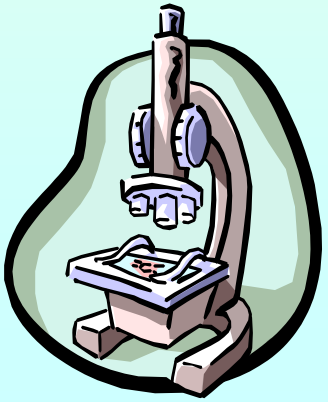


Life Science



Dr. habil. Anna Salek

Education:

- **Study of Food Microbiology: M. Degree (1970) and Ph. Degree (1979) in Microbiology / Biochemistry / Biotechnology ("An influence of gamma irradiation with Co^{60} and nitrites on enzymatic system / metabolism of bacteria from family *Enterobacteriaceae*") from at the University of Warsaw, Poland;**
- **Sc.D. habilitation (1989) at the University and at the Institute of Biotechnology in Warsaw ("A physiology / fermentation and a cell engineering of yeast, as well as genetic construction of new *Saccharomyces cerevisiae* strains");**
- **Fellowship of UNDP/FAO in USA and in Germany (1989-1990): "Development of new genetic engineering methods (biophysics) for the improvement of industrial microorganisms".**

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Career:

Work in research and didactics:

- **At the University of Warsaw (on food microbiology) and as research associate (1970-1979);**
- **At the Institute of Biotechnology in Warsaw: on the optimisation of fermentation process and on the yeast cell engineering (1979-1989);**
- **At the University of Würzburg-Regensburg-Düsseldorf in Germany: on the genetic yeasts, i.e. electro-fusion of protoplasts and electro-transformation of yeast dsRNA (1989-1992);**
- **At the Technical University of Munich, and a co-operation with the pharmaceutical industry in Germany: on the modern biochemistry of protein: purification and a biochemical characterisation of glycoproteins for pharmaceutical development, on the mammalian cell cultures and as Regulatory Affairs Scientist for veterinary medicine (1992-1996);**
- **At the GSF-National Research Centre for Environmental and Health (GmbH) in Munich, Germany (on the PCR technique, applied for detection and identification of medically / environmental important fungi and development the automated yeast identification system (1996-1997).**

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Career:

Work for pharmaceutical industry:

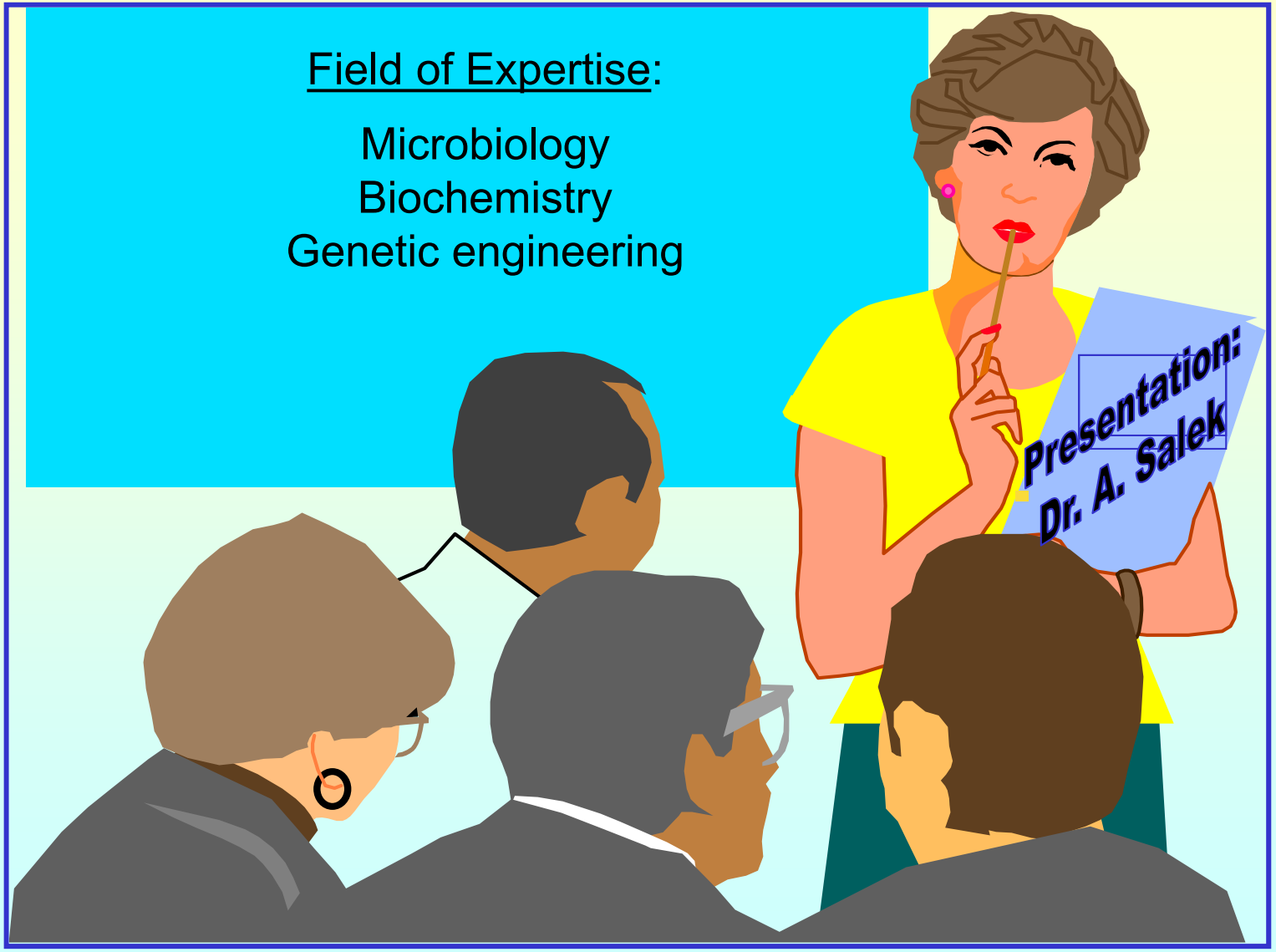
- **At the pharmaceutical firm in Passau, Germany: managing of projects on the microbiology, chemistry and validation of veterinary medicines as well as manager of pharmaceutical products production (1997-1999).**

Work for commercial laboratory analysis & research (as manager):

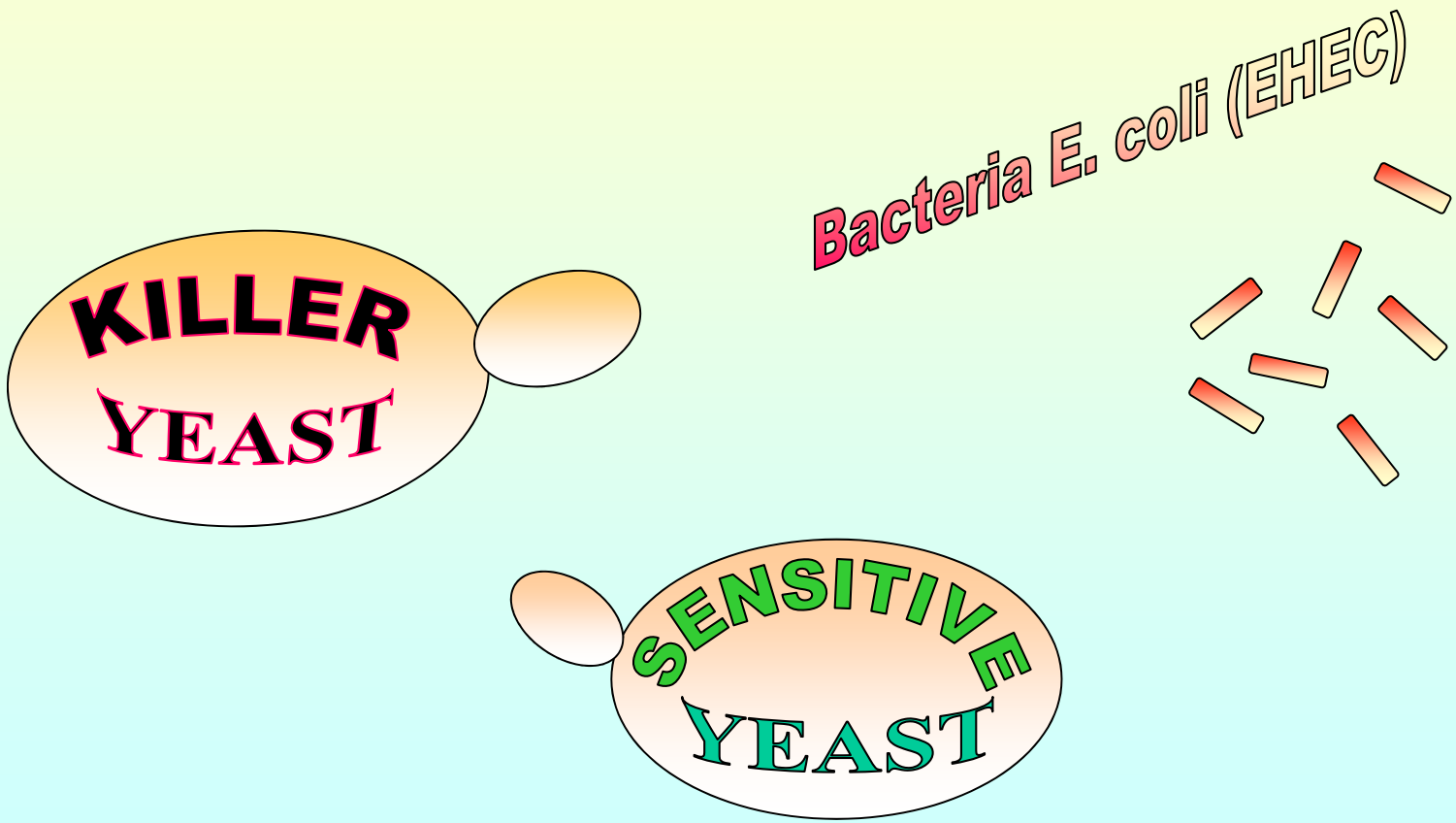
- **As a manager of Laboratory at the two Institutes in Germany (Milan in Passau, domatec GmbH - Mühldorf): work on the microbiology / mycology / chemistry of environment (drinking water & air), food and BSE (since 1999 - until now).**

Field of Expertise:

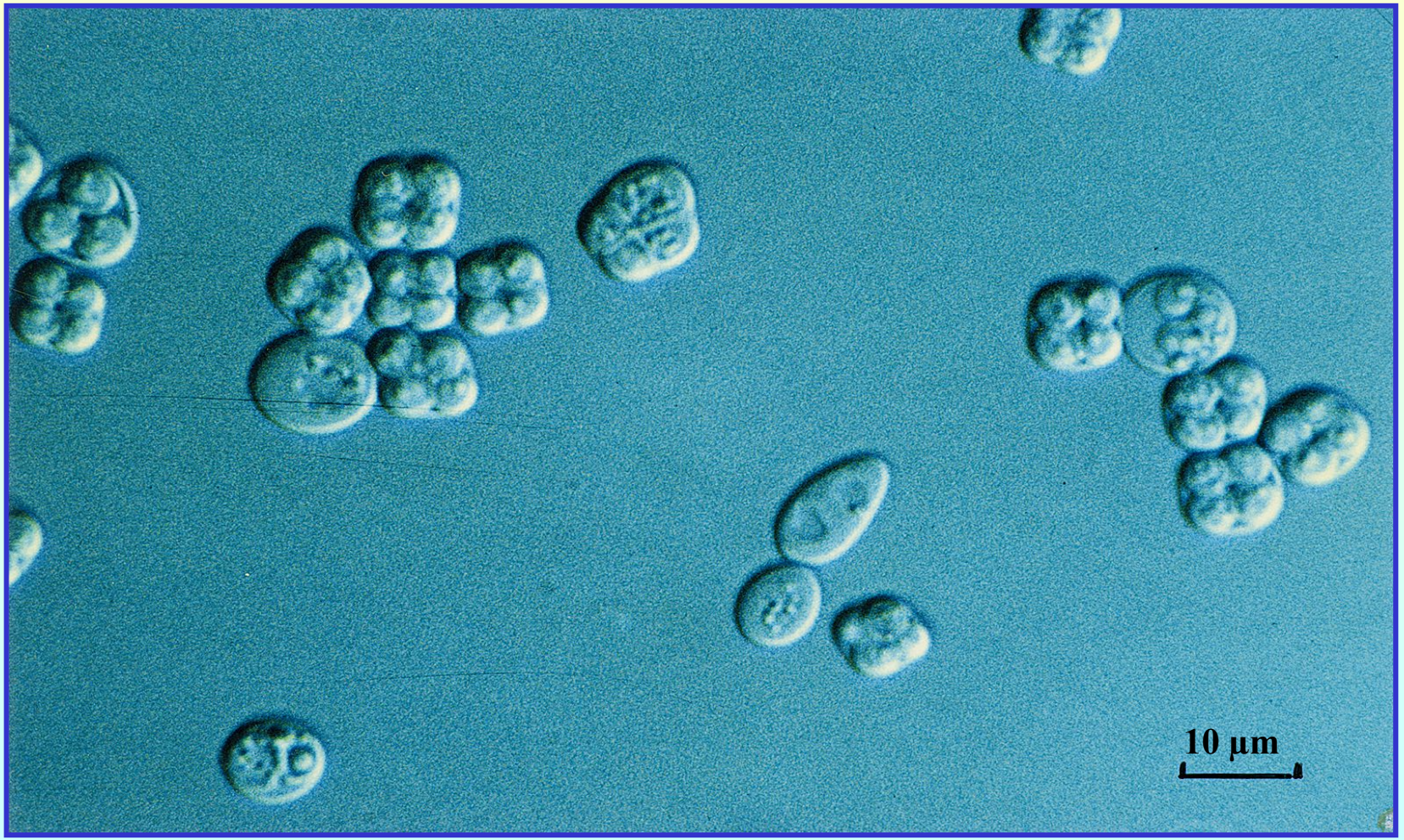
Microbiology
Biochemistry
Genetic engineering



Yeast Antimicrobial Proteins



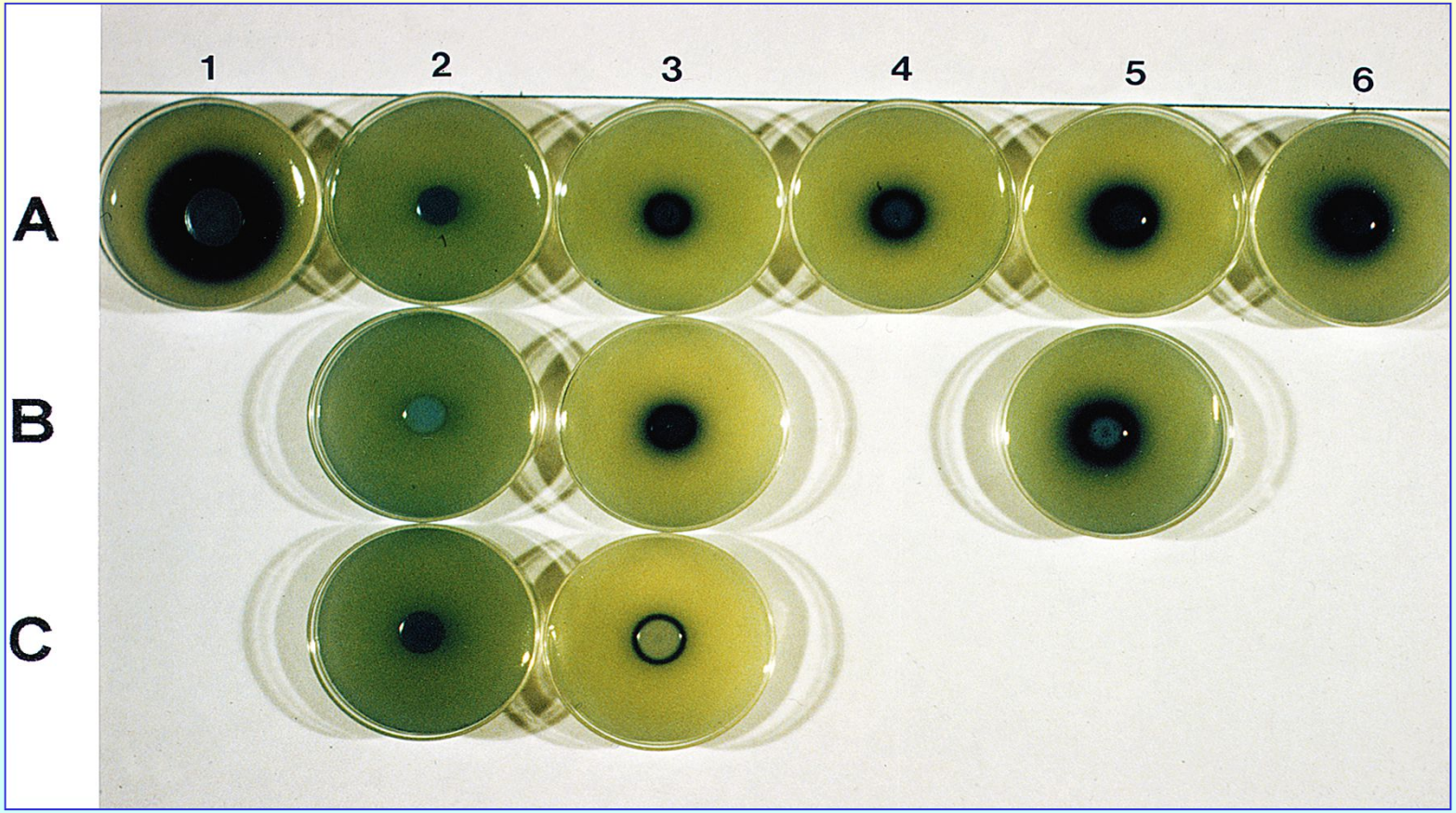
Killer Yeast cells in vegetative and sporulation form



KILLER PHENOMENON – SPECIFIC SECRETORY SYSTEM

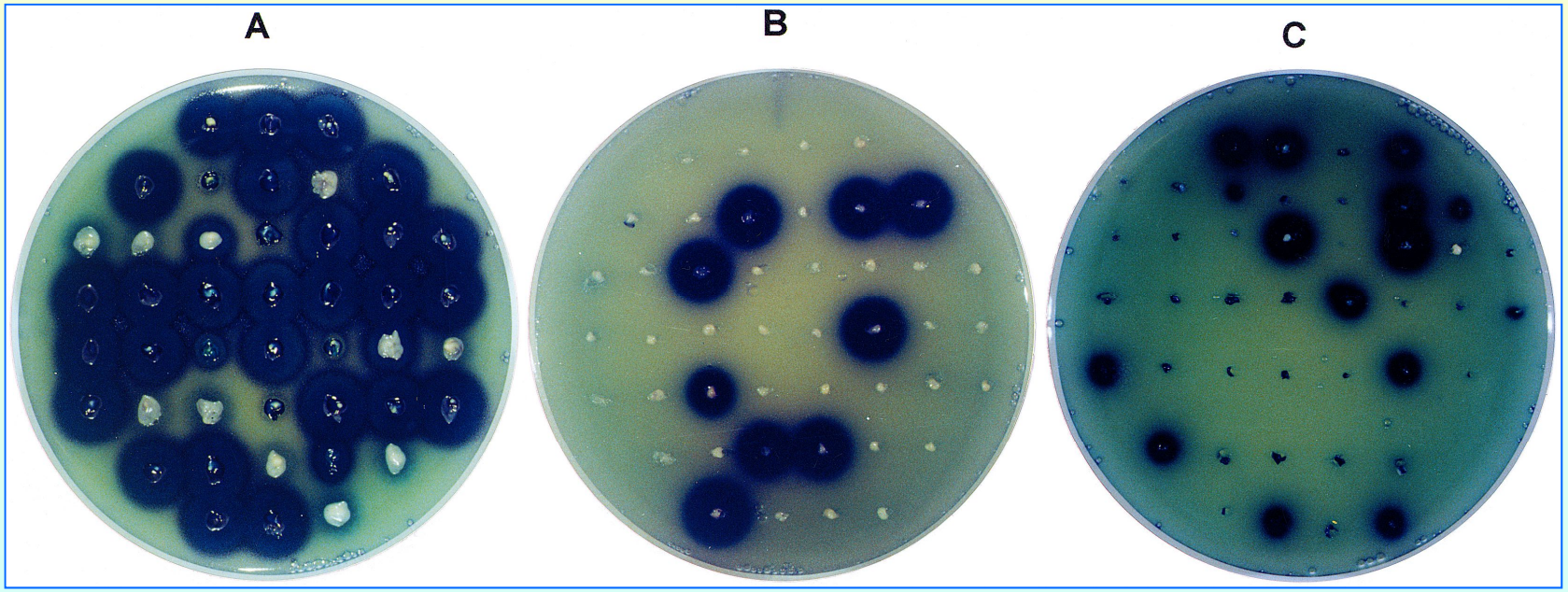
The killer phenomenon has been reported for strains of the genera *Saccharomyces*, *Kluyveromyces*, *Hansenula* (or *Pichia*), *Hanseniaspora*, *Williopsis*, *Candida*, *Torulopsis*, *Debaromyces*, *Cryptococcus* and *Ustilago*. The above-mentioned yeasts produce toxins which act against sensitive strains of the same or closely related genera or species as well as against unrelated microorganisms (including pathogenic) and also some viruses.

Killer activity assay – in supernatant



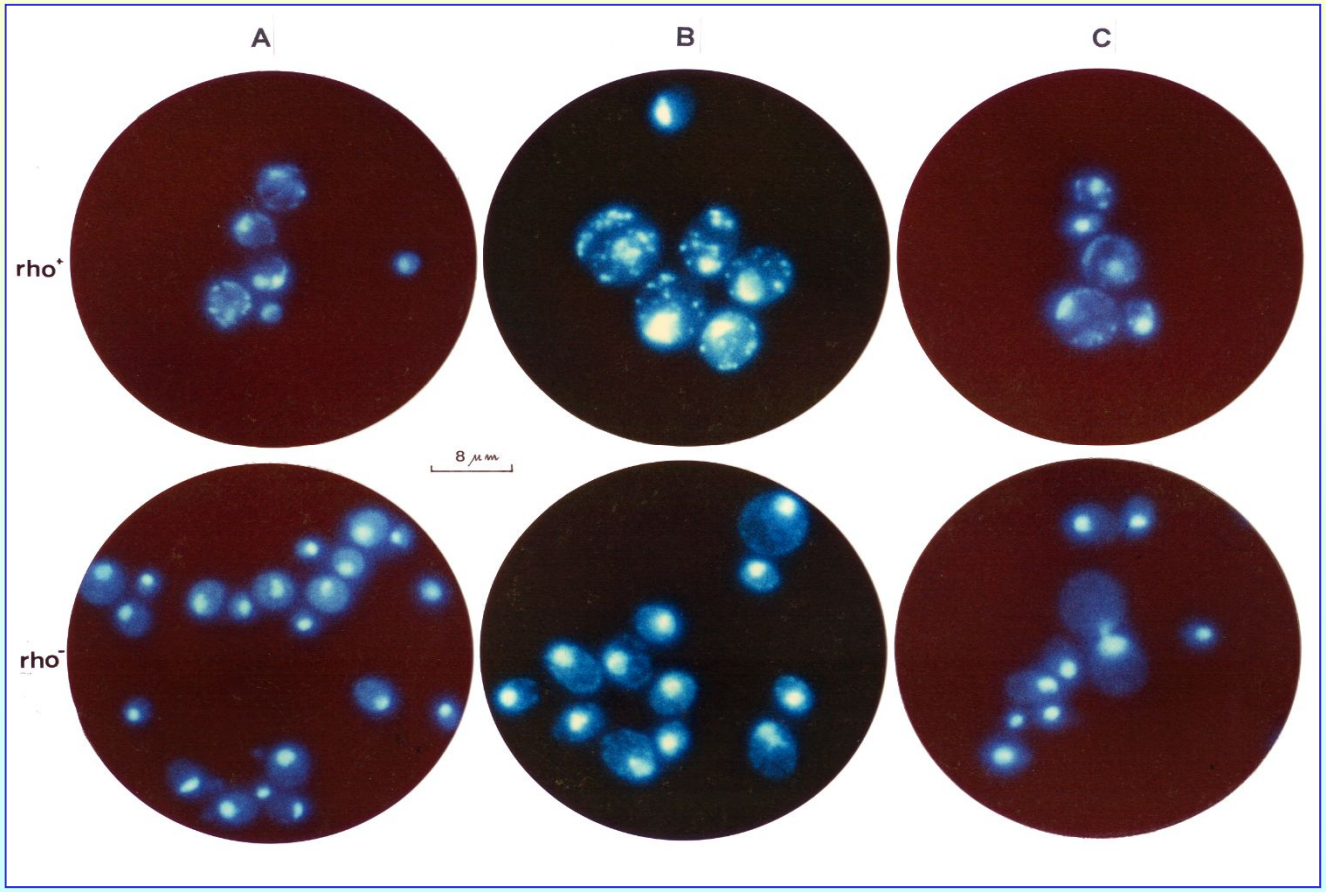
Petri dishes carrying assays for killer activity of single colonies of different yeast strains

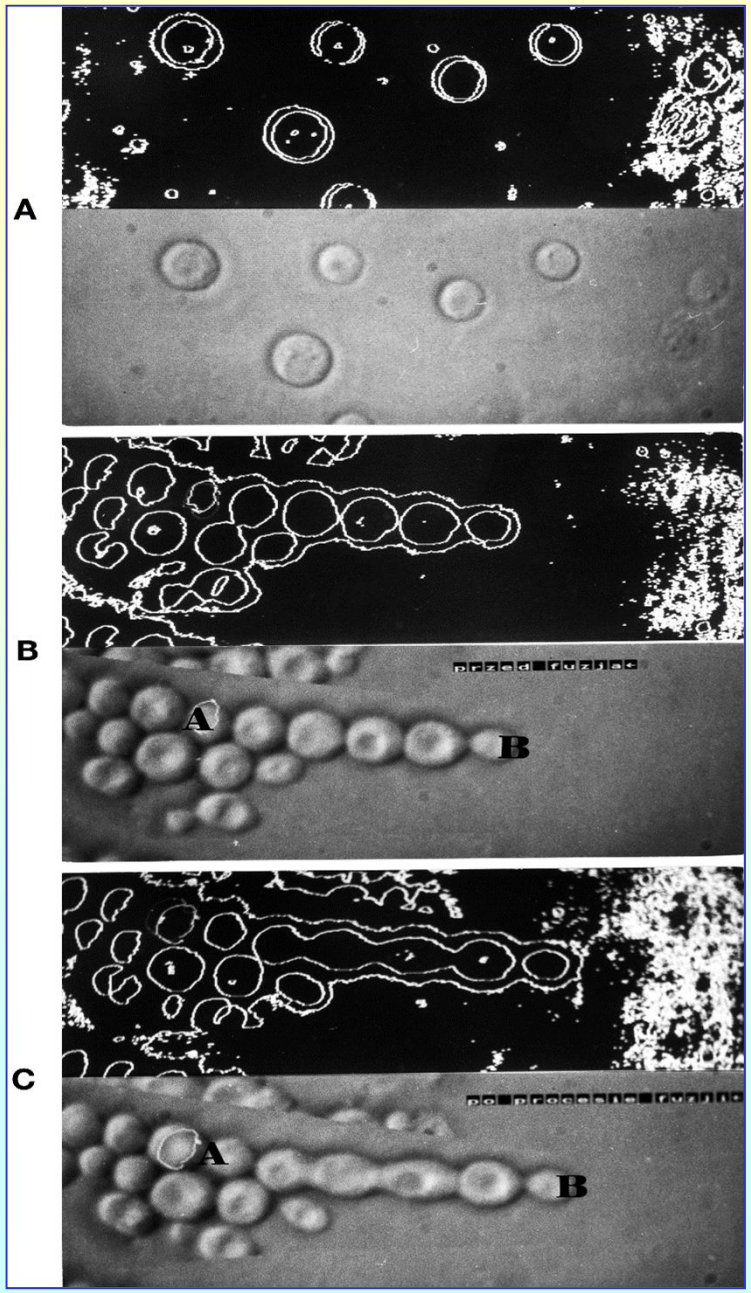
Killer activity assay after elctrotransformation



A - in transformed killer-negative strain,
B - in the laboratory killer-sensitive strain,
C - in the industrial killer-sensitive strain

Fluorescence micrographs of DAPI - stained yeast cells of *rho*$^{+}$ and *rho*$^{-}$





Electrofusion

A. Dielectrophoresis

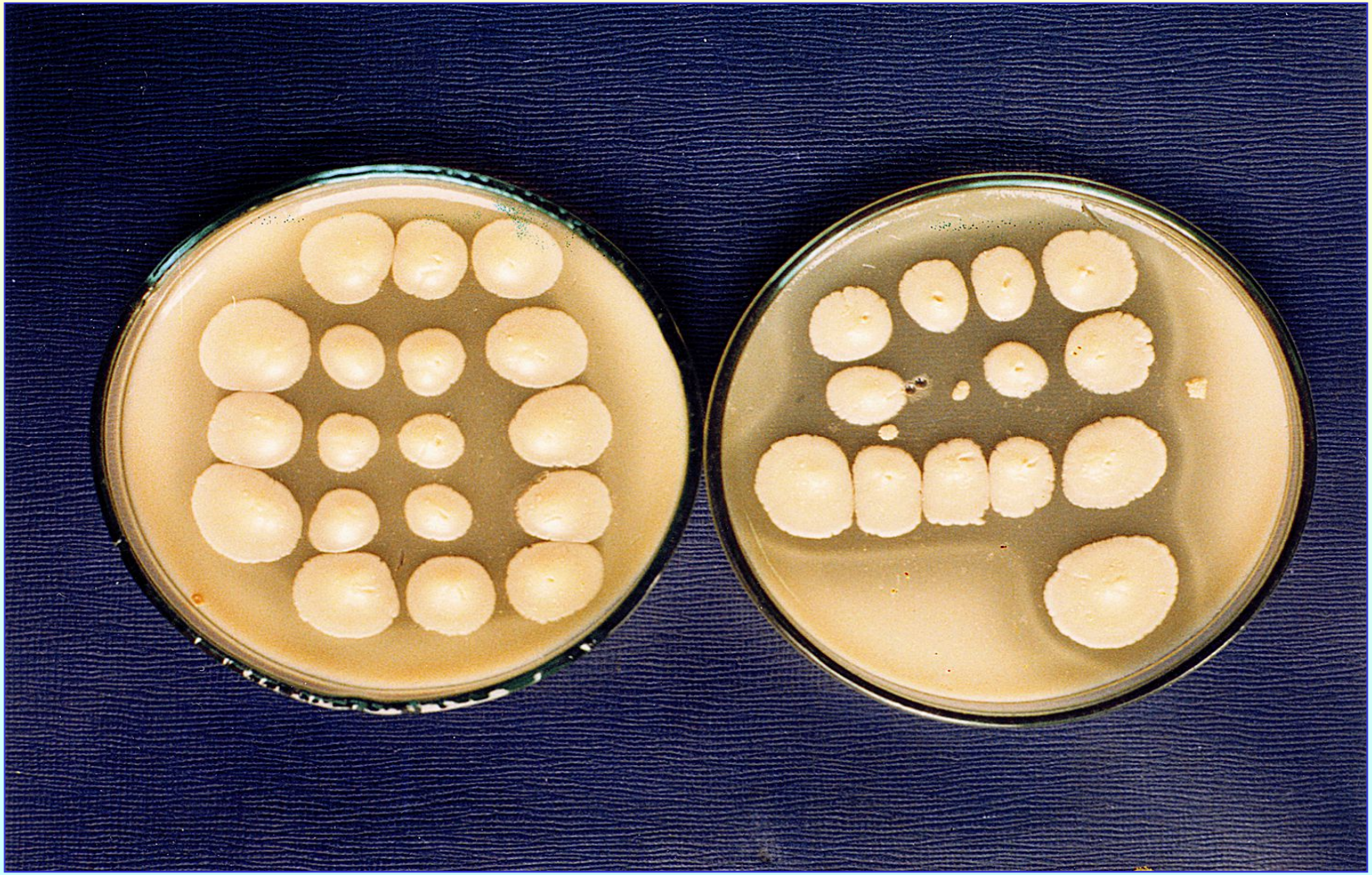
Electrofusion

B. Disturbance of phospholipids

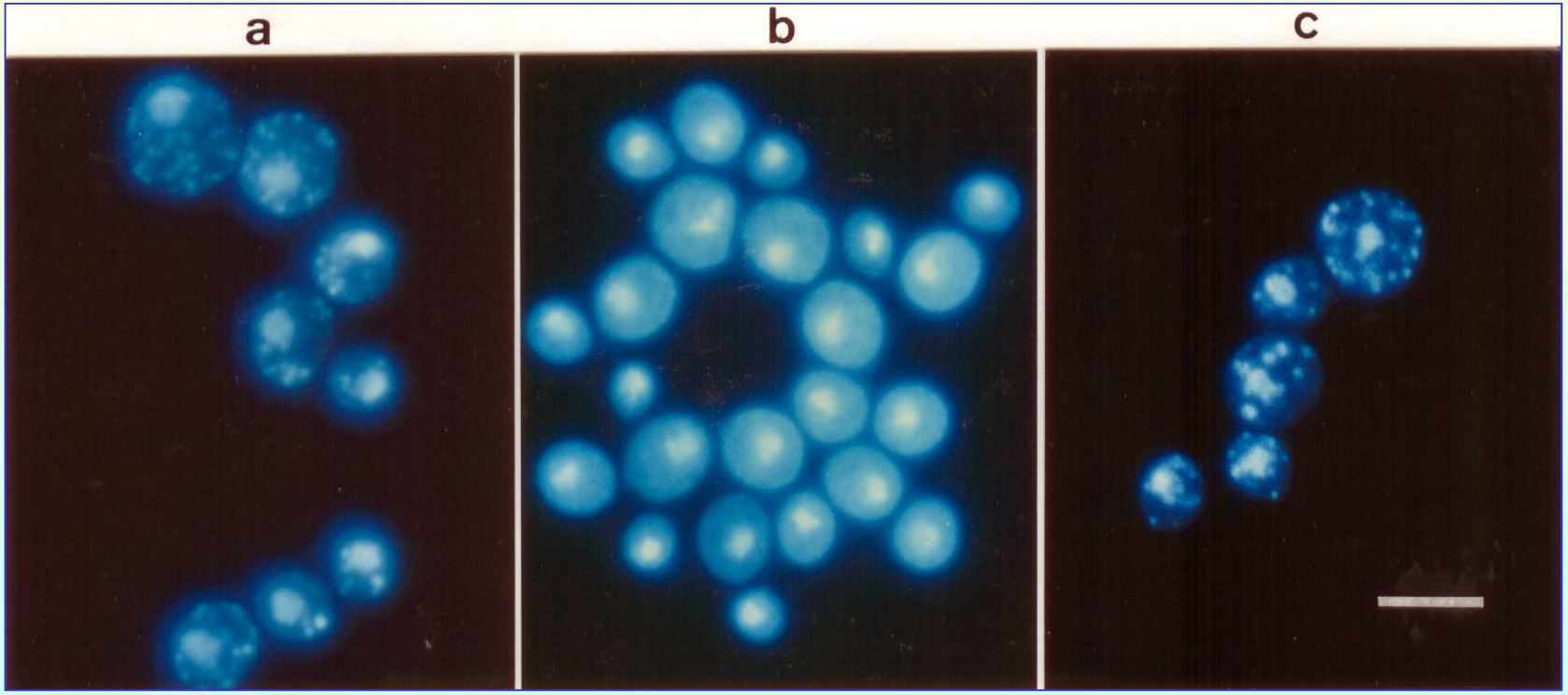
Electrofusion

C. Fusion of cytoplasms

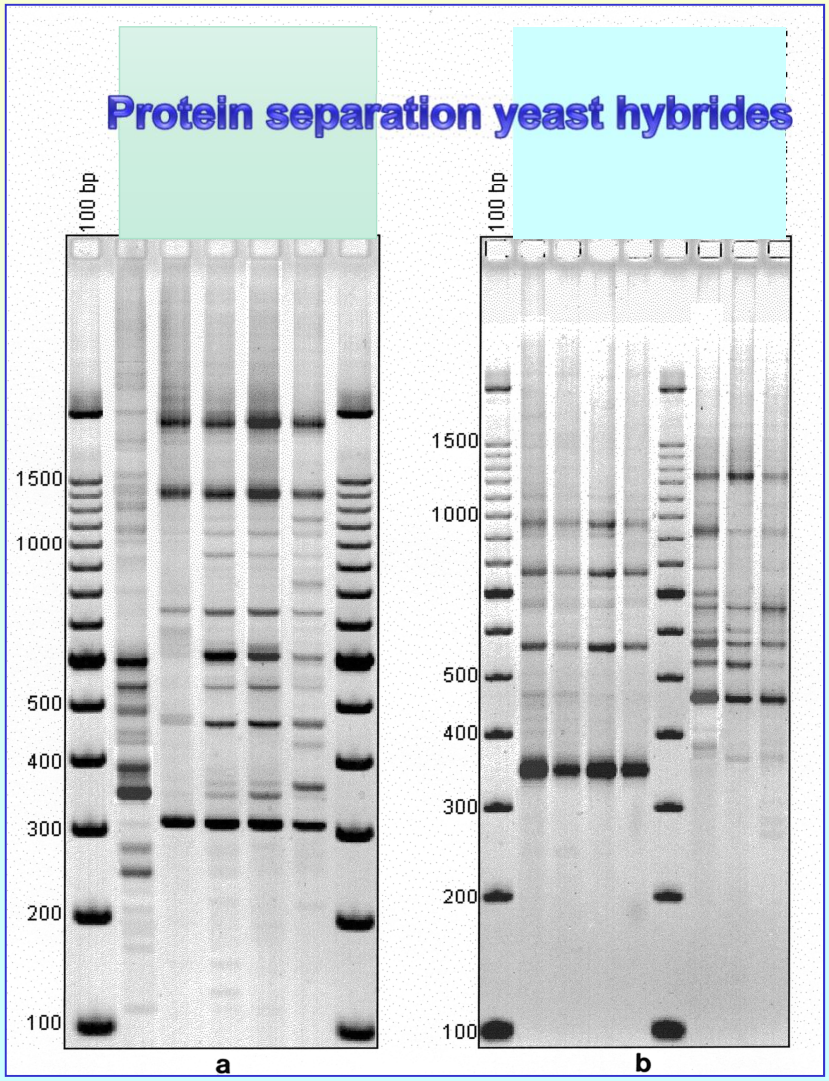
Colonies of killer hybrids formed by electrofusion



Fluorescence micrographs of DAPI-stained yeast spheroplasts



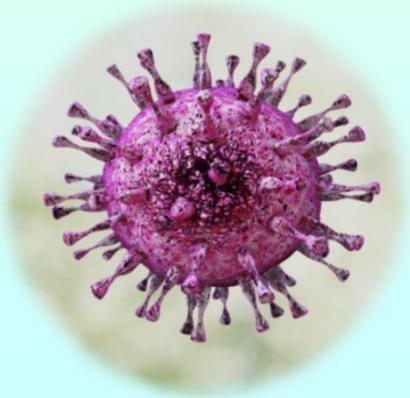
Detection by IL-PCR fingerprints (primer GF) of misclassification of yeast strains



Therapeutic oral preparate against 2019-nCOV

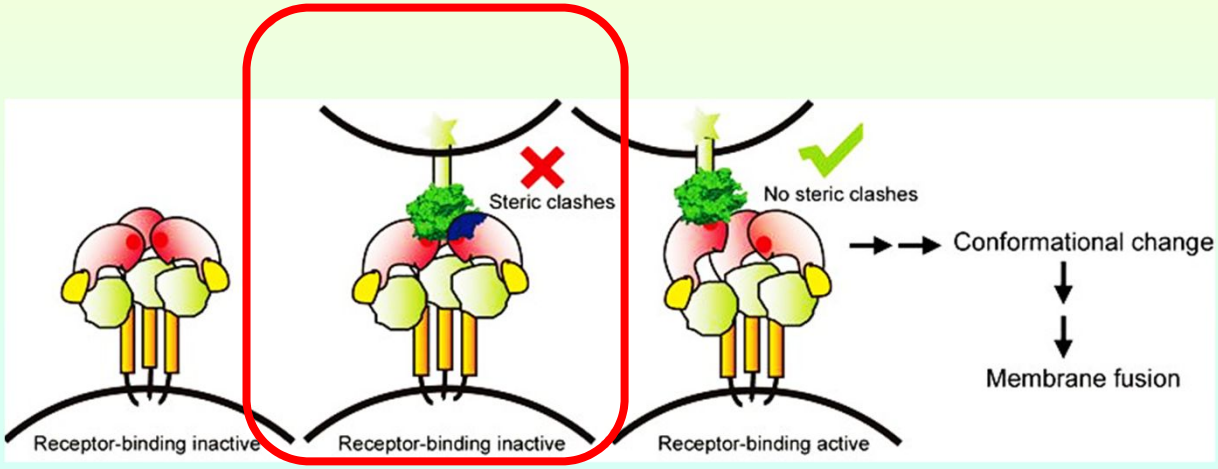
We are presenting an integrative antiviral drug methodology, which combines a systems pharmacology-based network medicine platform that quantifies the interplay between the Coronavirus and host (human macrophage) interaction and break virus targets in the human network. The basis for that medicine are:

- **Yeast killer protein / glycoprotein,**
- **Specific hydrolases and effector,**
- **Immunomodulator**



Yeast Killer Toxin (Protein)

The protein, e.g. yeast killer glycoprotein, that functionally associate with Coronavirus (COVID-19) infector (i.e. with spike or envelope). Therefore, it has localized in the subnetwork within the comprehensive human receptor.



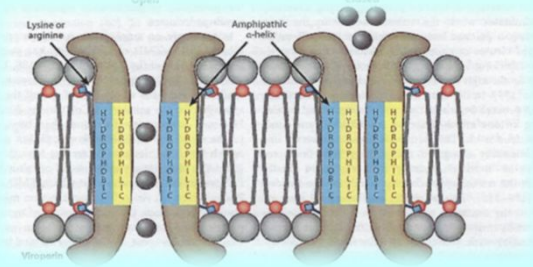
The basis of this mechanism is the specific binding of the corresponding receptors from killer glycoprotein together with receptors of glycoprotein in high-mannose-content glycan's on S glycoprotein of spike.

Killer toxin is making some structural changes in viral receptor binding domains (RBDs)

Yeast Killer Toxin (Protein)

Moreover, the viral ribonucleocapsid is cloased within a phospholipid bilayer of envelope and containing three above-mentioned proteins. In addition, single nucleocapsid structure is an important subunit for packaging the viral genome (ssRNA) through protein oligomerization.

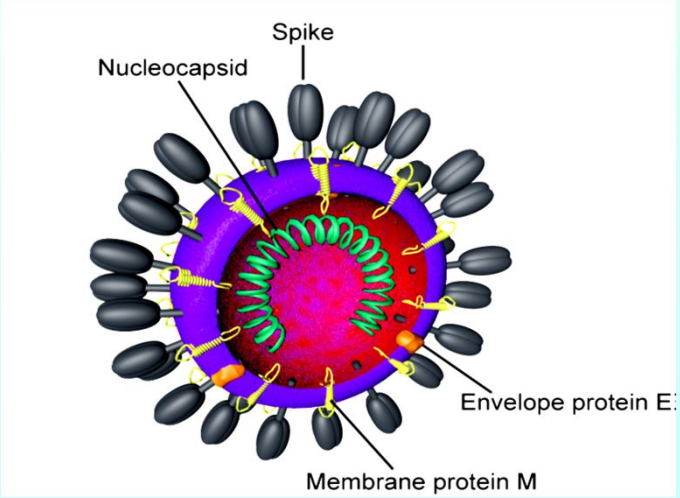
General, some structure of Coronavirus could be destroyed by killer toxins as well as through competent like-proteases and biological substances from our oral medicine, which also partly destroyed phospholipids bilayer in Coronavirus envelope.



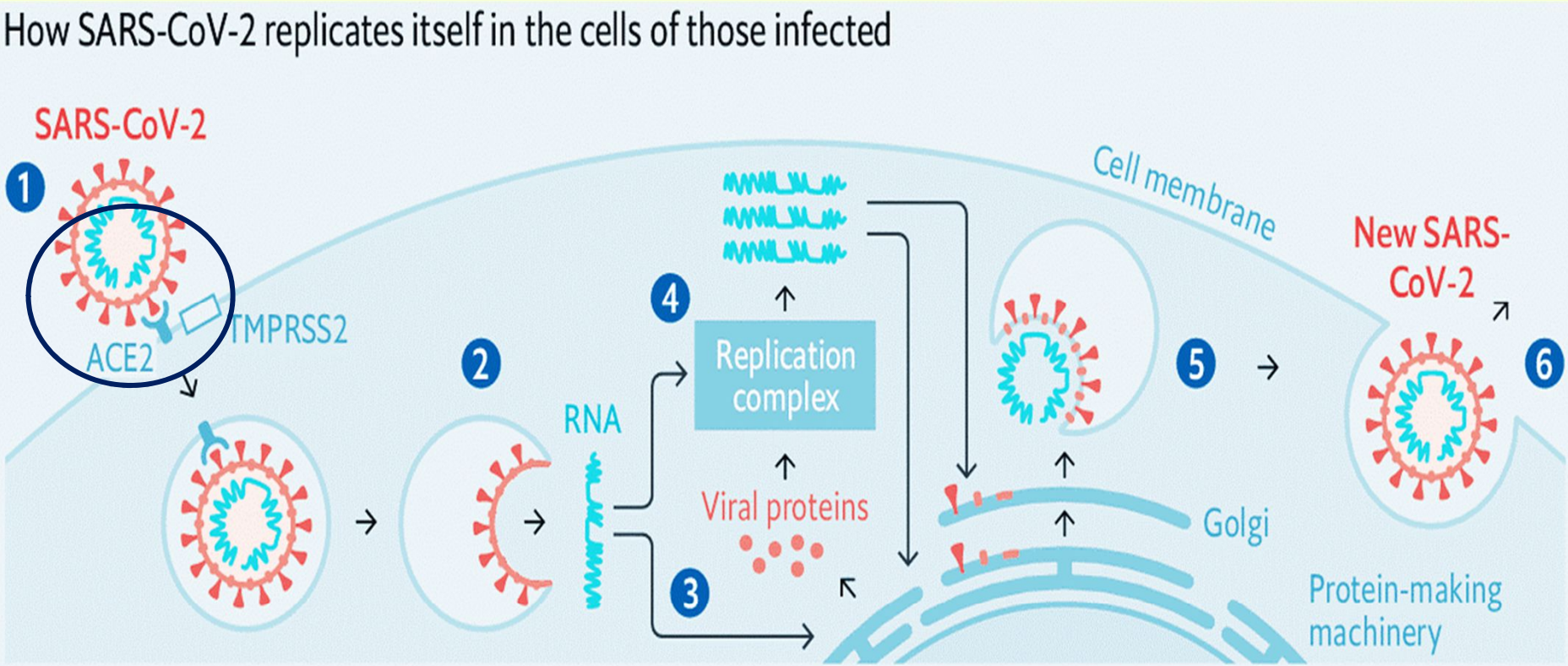
Structural Basis of Receptor by SARS-CoV-2

Coronavirus has five major protein regions for virus structure assembly and viral replications, including replicase complex (ORF1ab), spike (S) glycoprotein (which can be divided into subunits, S1 & S2) in the presence of specific proteases.

Moreover, we have envelope (E) protein incorporated to phospholipid bilayer, membrane (M) protein and nucleocapsid (N) proteins with ssRNA inside capsid.



Receptor Recognition Mechanisms of Coronavirus



Conclusion

The properties of our killer toxin have been tested in veterinary praxis on 4000 small pigs with positive results (about 80%).

Population of 2000 sick pigs, infected with Coronavirus and Rotavirus, after 2-3 days got healthy and rid of the infection. In the same time 2000 control group was lost.

Conclusion

Having regard to the test from before

of our oral medical preparation,

which contains specific substances

probably against COVID-19,

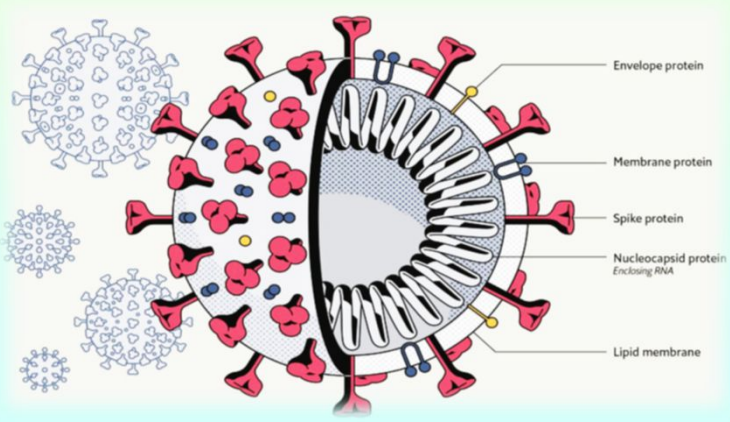
would be best medical need, possibly

allowing simultaneous immunization human

organism before SARS-CoV-2 infection.

This preparation could be soon in market.

Thank you for your attention!



e-mail: anna.salek@domatec.info