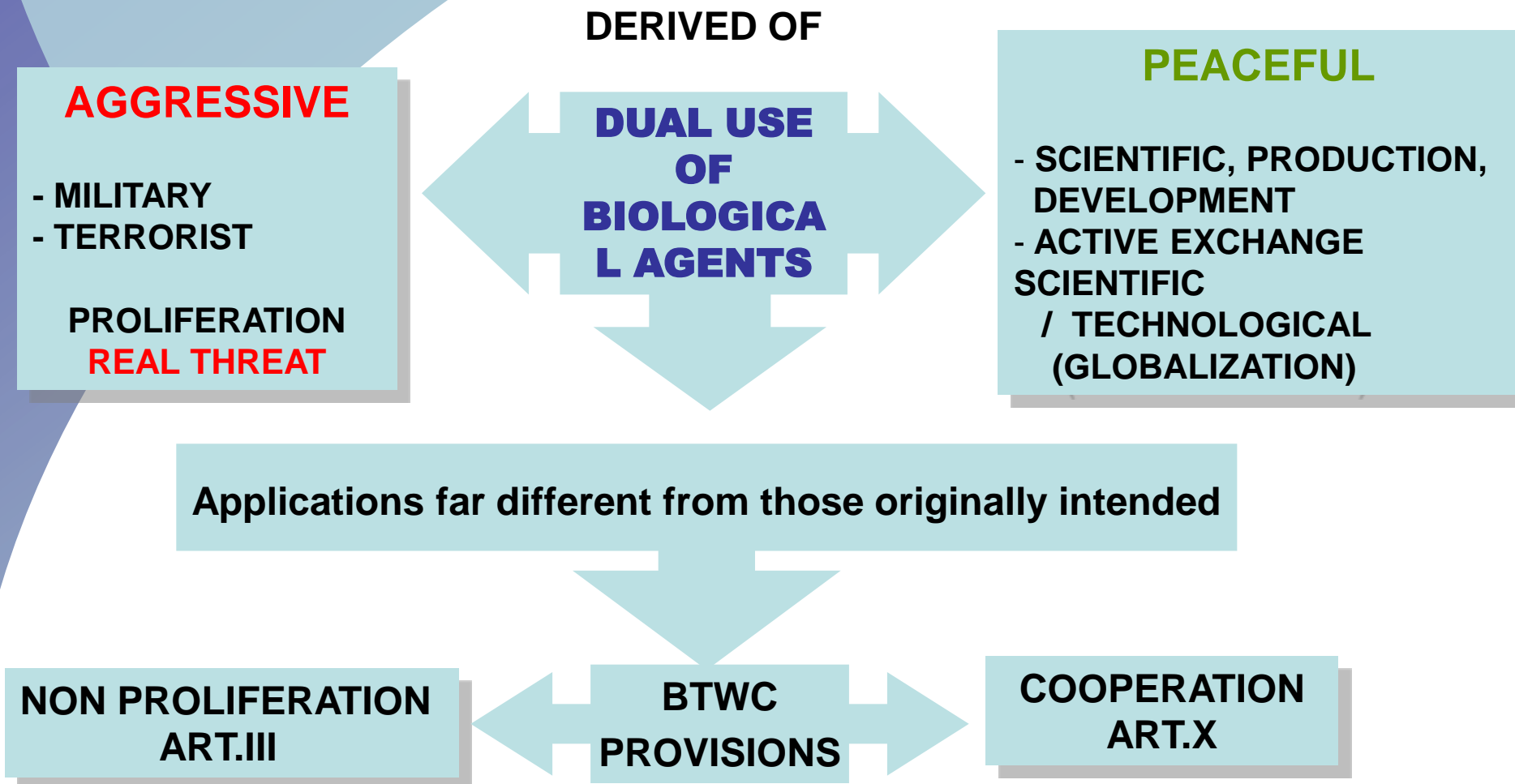


# **SCIENTIFIC AND TECHNICAL EXCHANGE A POTENTIAL IMPACT ON NON PROLIFERATION REGIME**

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# BIOAGGRESSION CONCERNS



# BIOAGGRESSION POTENTIAL

## MICROBIOLOGICAL AGENTS

### NATURAL

- EXISTING
- DISCOVERED

### GENETICALLY

- OBTAINED
- MODIFIED
- SYNTHETIC

## BIOREGULATORS

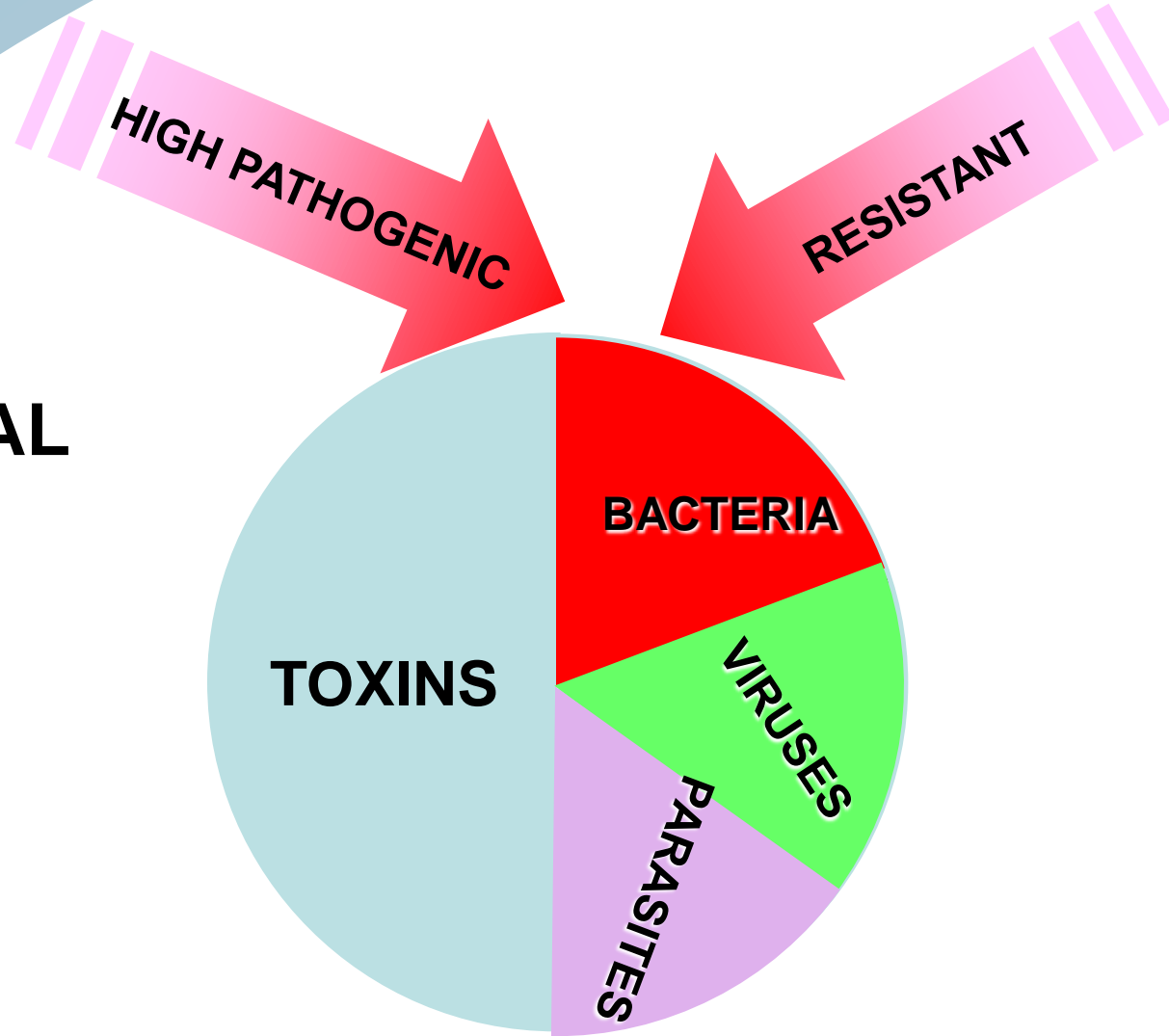
### MEDIATORS

- CYTOKINES
- NEUROTRANSMITTERS
- PEPTIDES-HORMONES

(New technological developments /  
dissemination of these mediators)

# BIOAGGRESSIVE AGENTS POSSIBLE

**A. NATURAL**



# BIOAGGRESSIVE AGENTS POSSIBLE

**TOXIN PRODUCING**

- NEW – UNKNOWN
- VERY AGGRESSIVE

## B. GENETICALLY MODIFIED

**HIGH  
VIRULENT**

**PATHOLOGY  
SEVERE  
- ATYPICAL**

**PROPHYLAXY:  
- MISSING**

**NEW  
?**

**CURRENT DETECTING/  
IDENTIFYING METHODS**

- PHENOTYPING -  
UNEFFICIENT
- GENOTYPING - USEFUL

**THERAPY  
UNADAPTED**

**DRAMATICAL INCREASE OF NUMBER AND VARIETY OF PATHOGENS**

# BIOAGGRESSIVE AGENTS POSSIBLE



## GENETICALLY OBTAINED

### SYNTHETIC MICROORGANISMS / RESEARCH

#### RARE ENCOUNTERED HIGH PATHOGEN (NEW ENTITIES)

- TAXONOMIC UNKNOWN
- PATHOGENIC DIFFERENT  
(ex. unmetilated synthetic genome  
/ prevent the host recognition)
- AUTOMATED RESEARCH

## CONTROLLED OR EXTINCT PATHOGENS

Already demonstrated

- WHO ADVISORY COMMITTEE ON  
VARIOLA VIRUS RESEARCH:  
Available technology could recreate  
VARIOLA VIRUS GENOME by  
chemicals sythensis
- ROBOT SCIENTISTS –  
Characterised network in biological  
systems

**DRAMATICAL INCREASE OF NUMBER AND VARIETY OF PATHOGENS**

## COOPERATION TRANSFER

SCIENTIFIC

### EDUCATION

- GRADUATE
- POST-GRADUATE
  - SPECIALISTS
  - DOCTORAL

### INFORMATION

- SCIENTIFIC MEETINGS
- INT. SOCIETIES
- PUBLICATIONS
- ELECTRONIC INFORMATION (NET)

### RESEARCH

#### COMMON PROGRAMMES

- BILATERAL
- MULTILATERAL
  - DEVELOPING STUDIES
  - DATA BASE ACCESS

DEVELOPMENT

# **DUAL USE RESEARCH DURING THE RESEARCH PROCESS**

## **CONCERNS**



### **PHASE I - PREPARATION**

**PRESENTATION OF  
PRELIMINARY DATA**

**DISCUSSIONS WITH  
COLLABORATORS**

**DRAFT APPLICATION REVIEW  
BY PEERS INSTITUTION  
ADMINISTRATION ETC.**

**REVIEW BY INSTITUTIONAL  
COMMITTEE MEMBERS**

**PROJECT DESCRIPTIONS ON  
INSTITUTION WEB PAGE OR IN PI CV**

**REVIEW BY IC STAFF  
AND STUDY SECTION**

**RESEARCH AWARD  
NOTICES/DESCRIPTION  
ON CRISP ETC.**



# **DUAL USE RESEARCH DURING THE RESEARCH PROCESS**



**TRAINING OF LAB STAFF, STUDENTS,  
VISITING SCIENTISTS**

**PRESENTATION AT DEPARTMENTAL SEMINARS**

## **PHASE II - ONGOING RESEARCH**

**PRESENTATIONS OR POSTERS AT NATIONAL  
OR INTERNATIONAL CONFERENCES**

**EVALUATION BY OTHER FACULTY  
IF THESIS PROJECT**

# DUAL USE RESEARCH DURING THE RESEARCH PROCESS



**PEER REVIEW OF MANUSCRIPT/  
RESEARCH PRODUCT**

## **PHASE III - DEVELOPMENT**

**PUBLIC DISSEMINATION OF RESEARCH FINDINGS  
OR PRODUCTS**

## COOPERATION TRANSFER

**TECHNICAL**

### TECHNICAL PROCEDURES

#### PRODUCTION

- KNOW HOW
- CONTROL
- BIOSAFETY

### HIGH TECH

#### EQUIPMENT

- PERFORMANT  
(SYNTHETIZERS)
- TARGETED
- AUTOMATED

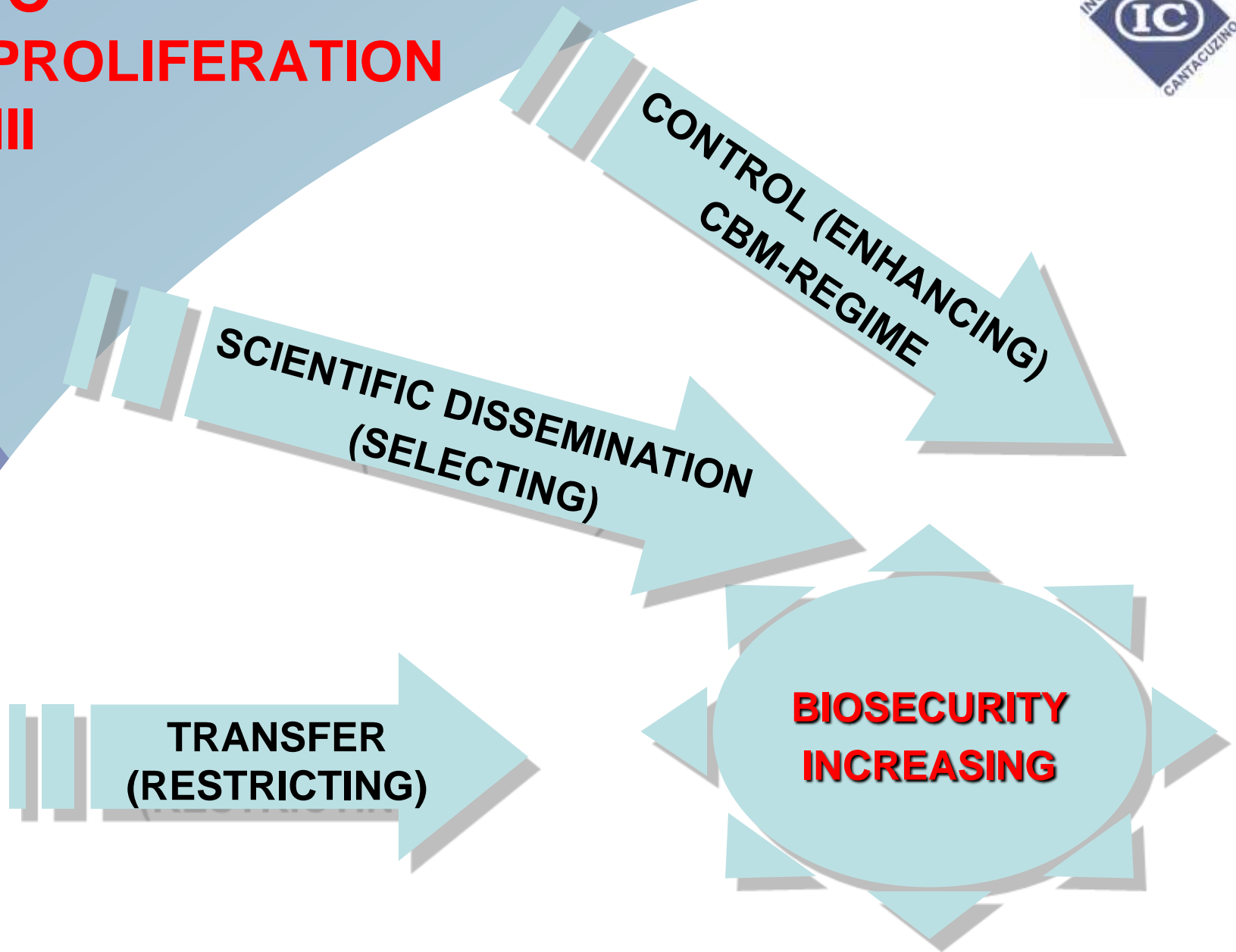
### BIOLOGICALS

#### REAGENTS

- CULTURE MEDIA
- ENZYMES
- NUCLEIC ACIDS
- CULTURES
  - MICROBIAL
  - CELL

**DEVELOPMENT**

# BTWC NONPROLIFERATION ART.III



# BTWC – NONPROLIFERATION REGIME



## TRANSFER: RESTRICTIONS/CONTROL

### KNOW HOW

- DNA DATABASE
- SEQUENCES INFORMATION SCREENING SYNTHESIS

### TECHNOLOGICAL

EQUIPMENTS  
PRODUCTION  
RESEARCH  
PERFORMANT IT  
GENETICALLY MACHINES  
(SYNTHETIC BIOLOGY)

### BIOLOGICALS

- CONTROL TRANSFERS
  - Microorganism
  - Raw materials
  - Enzymes
  - Commercial genes/ sequences

# CONTROL (ENHANCING)



## VISITS

- ON SITE

## CBM – REGIME

### DECLARATIONS

- Legislation/ Regulations
- Past activities  
Defensive / Defensive res.
- Vaccine production facilities

### DATA EXCHANGE

- Research Centres
- Programmes of defence
- Informations
  - Epidemiological
  - Accidents
- Promotion
  - Contacts
  - Publication of results

## NEW BIOSAFETY REGULATIONS

- Genetic engineering regime
- Safety and security working recommendation

# SELECT AGENTS

## NEW BIOSECURITY

- Harmonization of screening strategies
- Code for providing synthetic biological products
- Automated screening of commercial gene sequences
- Licensing equipment

## EDUCATING SCIENTIST ON DUAL USE ISSUES

### WARSAW WORKSHOP – 2009

- Strategies
- Educational
  - Programmes
  - Practice
- Ethics

**AN OLD ADAPTED PRINCIPLE  
TO BIOTERRORISM**

**PREVENTING IS BETTER  
THAN COMBATING**