

# Safer options to antibiotics in food animal farming

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# SCIENTIFIC ANIMAL HUSBANDRY PRACTICES...

STRESS PRECIPITATES DISEASES.....

- STRESS CAN BE .....
- ENVIRONMENTAL
- PHYSIOLOGICAL
- EMOTIONAL
- PRODUCTION RELATED ..Etc

## Reduce stress.... By providing good quality and right quantity

- Better ventillation
- Water sanitation
- Nutrition
- Optimal space
- Better litter/environment
- In house climate mitigations
- Automations to prevent human laxity
- Disinfections and sanitation of in house and premises

# Bio security

- Conceptual
- Structural
- operational

# vaccination

Preparation of vaccination schedule-  
Based on surveillance and monitoring

Adherence to schedule (implementation)

Serum titre evaluation ( monitoring)

# SPECIFIC DIAGNOSIS AND TREATMENT OF DISEASES

- LAB FACILITIES EXPEDITING SPECIFIC DIAGNOSIS
- QUARANTINE AND ISOLATION FOR SICK ANIMALS
- SQUANDERING WITH ANTIBIOTICS AND PROPHYLAXIS AND TO AN EXTENT METAPHYLAXIS MUST BE AVOIDED IN TREATMENT .**AMR MUST BE GIVEN UTMOST PRIORITY**

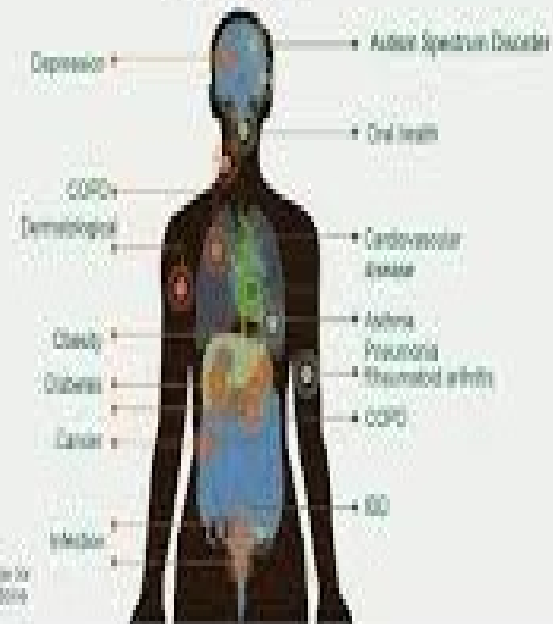
# 1 MICROBIOME

PROBIOTICS

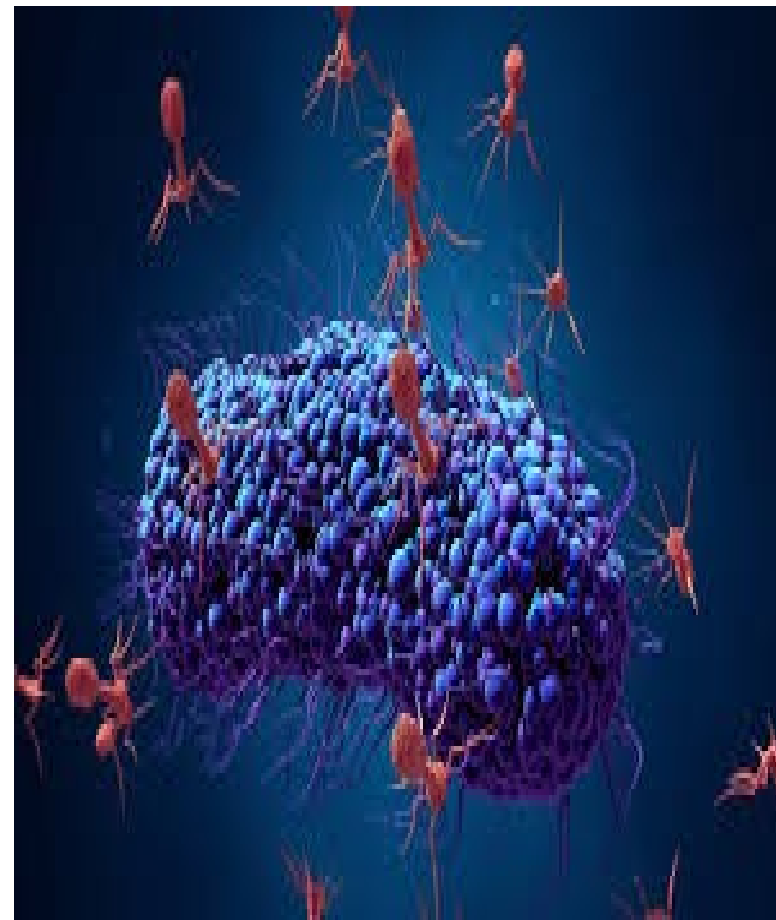
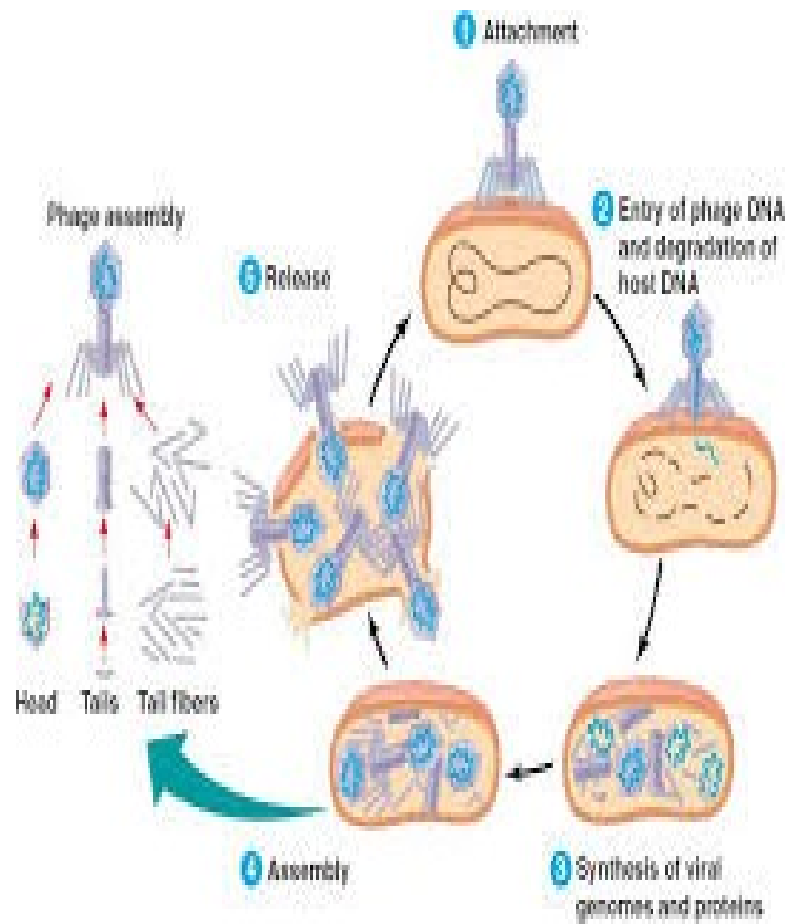
PREBIOTICS

FAECAL MICROBIAL  
TRANSPLANTATION

## Microbiome Perturbation Associates with Disease

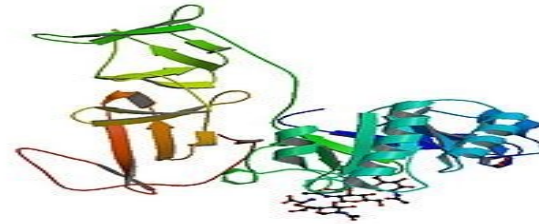


# 2 PHAGE THERAPY



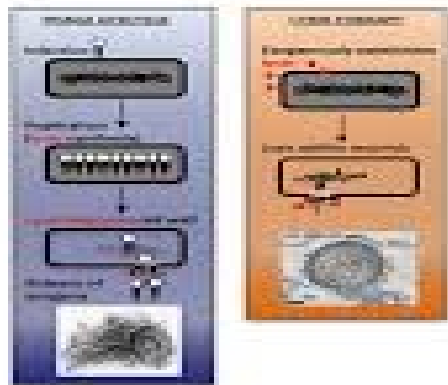


# 3 LYSIN THERAPY



- Lysins, also known as endolysins or murin hydrolases, are hydrolytic enzymes produced by bacteriophages in order to cleave the host's cell wall during the final stage of the lytic cycle

## Lysins – DLAs to Potentially Treat Serious, Resistant Infections



### Lysins are direct lytic agents derived from bacteriophage

In nature – highly potent bacterial killer

Novel mechanism of action  
Enzymes targeting the bacterial cell wall  
leading to immediate death

Recombinantly produced and purified  
biologic therapy

### Hallmark features of lysins

Rapid, direct and targeted bactericidal activity

Elimination of biofilms

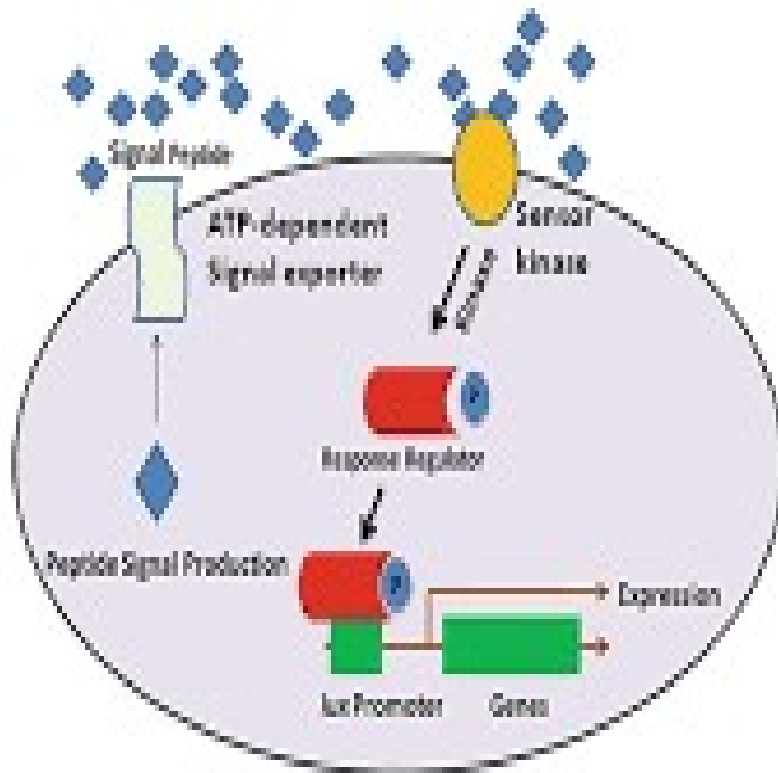
Synergy with conventional antibiotics

Low propensity for resistance

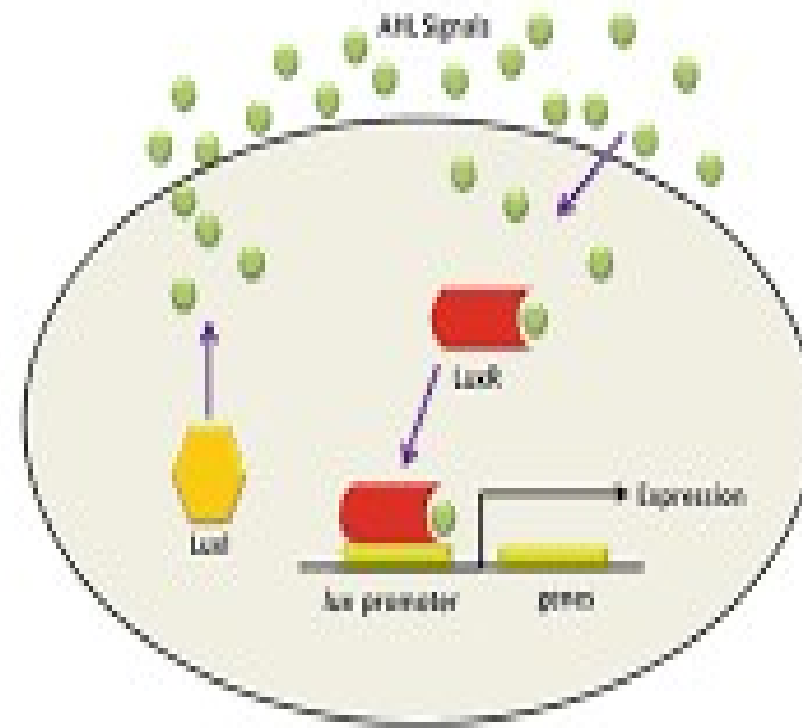
# 4 ANTIMICROBIAL PROTEINS/PEPTIDES

Activity	Peptide	Structure	Source	Pathogen	Reference
Antibacterial	Cecropin	$\alpha$ -helix	Silk moth	G +ve, G -ve	13
	Magainin	$\alpha$ -helix	Frog	G +ve, G -ve	14
	Protegrin	$\beta$ -sheet	Human, Porcine	G +ve, G -ve	15
	Bactenecin	Cyclic	Bovine neutrophils	G +ve, G -ve	6
	PR-39	Extended	Porcine	G +ve, G -ve	16
Antiviral	Melittin	$\alpha$ -helix	Honey bee	HSV	17
	Cecropin	$\alpha$ -helix	Insect	HSV, HIV	18
	Dermaseptin	$\beta$ -sheet	Frog	HSV, HIV	19, 20
	Lactoferrin	$\beta$ -turn	Bovine, Human	HSV, HIV, Papilloma	21
	Defensin	$\beta$ -sheet	Human, Rabbit	Adeno, HIV, HSV, HCMV	21
Antiparasitic	Magainin2	$\alpha$ -helix	Frog	<i>P. caudatum</i>	22
	PMAP-23	$\alpha$ -helix	Porcine	<i>C. elegans</i>	23
	Defensin	$\beta$ -sheet	Mussel	<i>L. major</i>	21
Antifungal	Melittin	$\alpha$ -helix	Honey bee	<i>C. albicans</i>	24
	Indolicidin	Extended	Bovine	<i>T. beigeli</i>	25
	Cecropin	$\alpha$ -helix	Insect	<i>A. fumigatus</i>	26

# 5. QUORUM SENSING & ITS APPLICATIONS

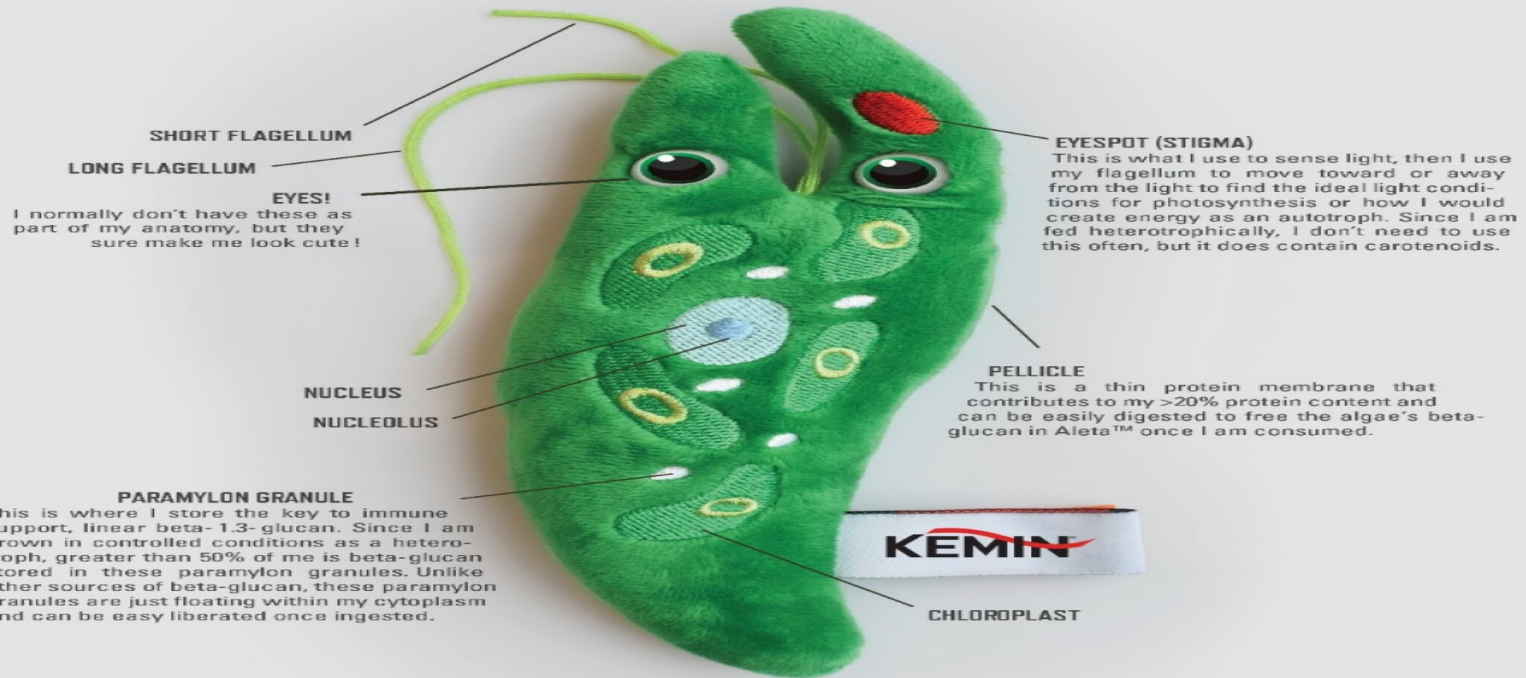


Gram-positive (QS system)



Gram-negative (QS system)

# 6 IMMUNO MODULATION



SHORT FLAGELLUM  
LONG FLAGELLUM

**EYES!**  
I normally don't have these as part of my anatomy, but they sure make me look cute!

NUCLEUS  
NUCLEOLUS

**PARAMYLON GRANULE**  
This is where I store the key to immune support, linear beta-1,3-glucan. Since I am grown in controlled conditions as a heterotroph, greater than 50% of me is beta-glucan stored in these paramylon granules. Unlike other sources of beta-glucan, these paramylon granules are just floating within my cytoplasm and can be easily liberated once ingested.

**EYESPOT (STIGMA)**  
This is what I use to sense light, then I use my flagellum to move toward or away from the light to find the ideal light conditions for photosynthesis or how I would create energy as an autotroph. Since I am fed heterotrophically, I don't need to use this often, but it does contain carotenoids.

**PELLICLE**  
This is a thin protein membrane that contributes to my >20% protein content and can be easily digested to free the algae's beta-glucan in Aleta™ once I am consumed.

CHLOROPLAST

**My name is *Euglena gracilis***

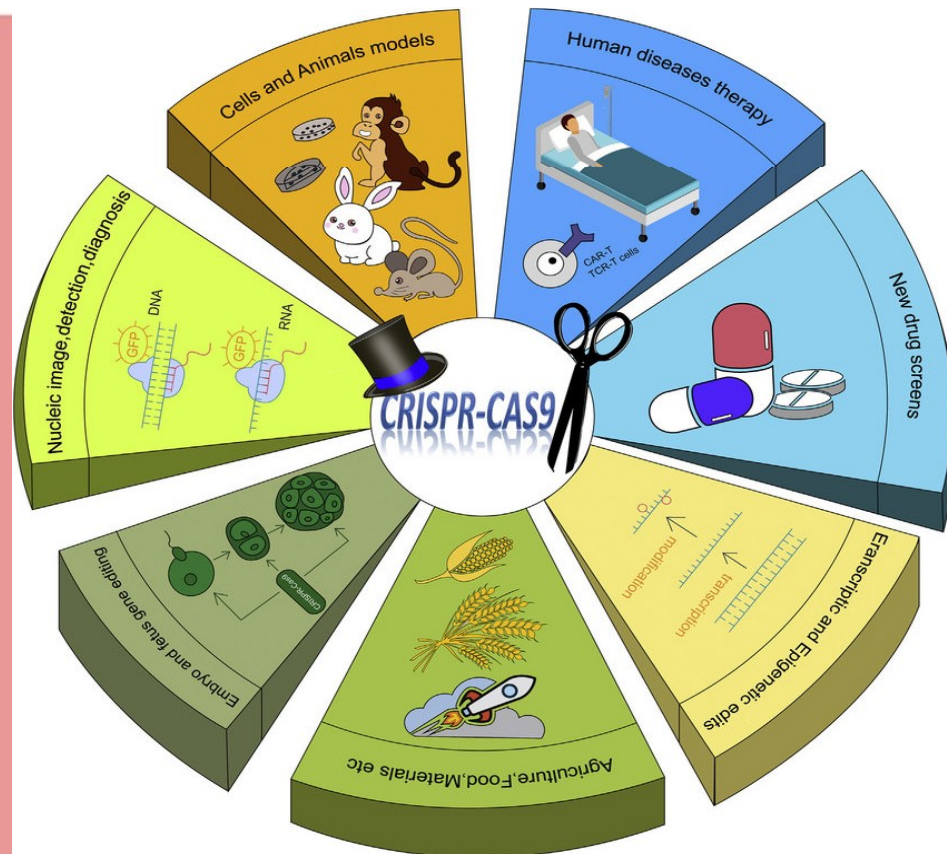
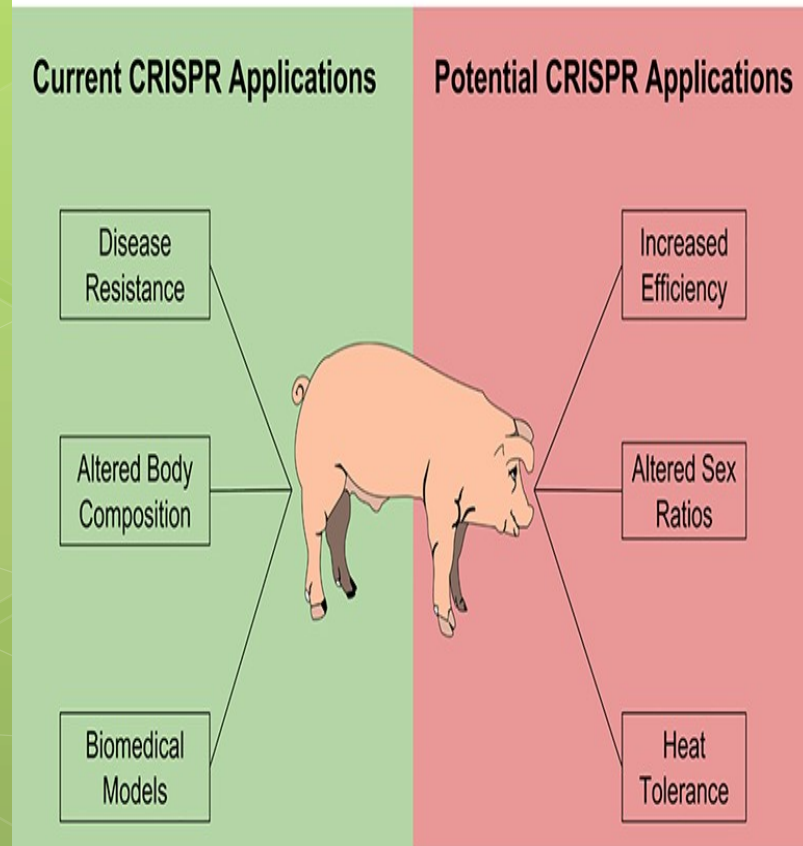
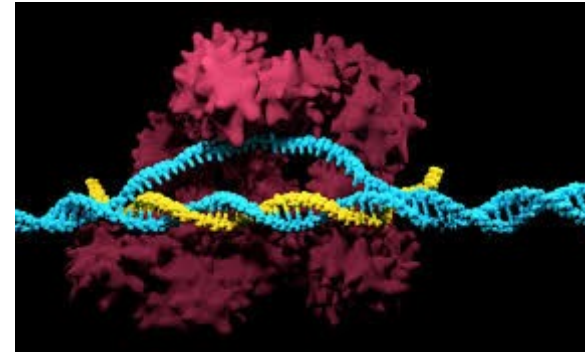
**I am an Amazing Algae**

# 7. HERBAL AND ALTERNATIVE TREATMENTS

**Table 10-1** Modern Drugs from Traditional Medicines

<b>Drug</b>	<b>Medical Use</b>	<b>Source</b>	<b>Common Name</b>
Aspirin	Reduces pain and inflammation	<i>Filipendula ulmaria</i>	Queen of the meadow
Codeine	Eases pain; suppresses coughing	<i>Papaver somniferum</i>	Opium poppy
Ipecac	Induces vomiting	<i>Psychotria ipecacuanha</i>	Ipecac
Pilocarpine	Reduces pressure in the eye	<i>Pilocarpus jaborandi</i>	Jaborandi plant
Pseudoephedrine	Reduces nasal congestion	<i>Ephedra sinica</i>	Ma-buang shrub
Quinine	Combats malaria	<i>Cinchona pubescens</i>	Cinchona tree
Reserpine	Lowers blood pressure	<i>Rauwolfia serpentina</i>	Rauwolfia
Scopolamine	Eases motion sickness	<i>Datura stramonium</i>	Jimsonweed
Theophylline	Opens bronchial passages	<i>Camellia sinensis</i>	Tea
Tubocurarine	Relaxes muscles during surgery	<i>Chondrodendron tomentosum</i>	Curare vine
Vinblastine	Combats Hodgkin's disease	<i>Catharanthus roseus</i>	Rosy periwinkle

# 8. CRISPR CAS9 GENE EDITING TECHNOLOGY





# ANTIBIOTIC GUARDIAN

Keep  Antibiotics Working

*THANK YOU*

DR R SUDHI