QA & QC

BIOLOGICAL ASSAY		
Digitalis	Pigeons	**Pigitalis**
Insulin	Rabbits	**Rabbinsulin**
Tubocurarine	Rabbit	**Tubocurrabit**
Glucagon	Cat	**Glucatgon**
Corticotropin injection	Rats	**Corats**
Cod Liver Oil	Rats	
Chorionic Gonadotropin	Female Rats	
Vasopressin	Male Rats	**Vamarat**
Oxytocin	Chicken	**Oxytochic**
Parathyroid Hormone	Dog	**Paradog**
Heparin	Sheep	**Sheeparin**

MICROBIAL ASSAY		
ANTIBIOTICS		
Penicillin G	*Staphylococcus aureus*	**PenStaph**
Bacitracin	*Micrococcus luteus*	**BaMi**
Streptomycin	*Klebsiella pneumonia*	**StrepKleb**
Chloramphenicol	*Eschericha coli*	**Chloresh**
Vancomycin	*Baciilus subtilis*	**VaBa**
Antifungal	*Saccharomyces cerevisiae*	
VITAMINS		
Vit. B_2	Riboflavin	*Lactobacillus casei*
Vit. B_3	Niacin	*Lactobacillus plantarum*
Vit. B_5	Pantothenic acid	
Vit. B_{12}	Cyanocobalamin	*Lactobacillus leichmanii*

KARL-FISCHER TITRIMETRY	
Titrant	Karl-Fischer Reagent
	Std.: **Sodium Tartrate dihydrate** ($C_4H_4Na_2O_6 \cdot 2H_2O$)
Titer Value	5mg H_2O = 1mL KFR
Components	**"PIMS"** Pyridine, Iodine, Methanol, SO_2

$$\%\ \boldsymbol{H20} = \frac{\boldsymbol{mL\ of\ KFR\ x\ EF}}{\boldsymbol{wt.(mg)}}\ \boldsymbol{x\ 100}$$

SIEVE ANALYSIS		
# 8	**V**ery Coarse	$\%\boldsymbol{WC} = \frac{\boldsymbol{initial\ wt. - final\ wt.}}{\boldsymbol{initial\ wt.}}\ \boldsymbol{x\ 100}$
# 20	**C**oarse	
# 40	**M**oderately Coarse	
# 60	**F**ine	
# 80	**V**ery Fine	

*** Endpoint:**

- If 5% of the sample weight is present on a sieve, then the % weight change is NMT 5%
- If <5% of the sample weight is present on a sieve, the % weight change is NMT 20%

DENSITY

BULK DENSITY	$\rho bulk = \frac{mass}{untapped\ volume}$
TAPPED DENSITY	$\rho tapped = \frac{mass}{tapped\ volume}$

*** Endpoint**

- If V_{500}-V_{1250} ≤ 2mL, then V_{1250} is the tapped volume
- If V_{500}-V_{1250} > 2mL, then repeat tapping in increments of 1250 times until the difference is <2mL.

ANGLE OF REPOSE

$$\tan\theta = \frac{h}{r} \qquad \theta = \tan^{-1}\left(\frac{h}{r}\right) \qquad r = \frac{d}{2}$$

COMPRESSIBILITY INDEX

$CI = \frac{untapped\ vol - tapped\ vol}{untapped\ vol}\ x\ 100$	$CI = \frac{\rho tapped - \rho bulk}{\rho tapped}\ x\ 100$

HAUSNER RATIO

$HR = \frac{untapped\ vol}{tapped\ vol}$	$HR = \frac{\rho tapped}{\rho bulk}\ x\ 100$

#Criteria

Flow Property	θ ºC	HR	CI
Excellent	25-30	1.00-1.11	≤10
Good	31-35	1.12-1.18	11-15
Fair	36-40	1.19-1.25	16-20
Passable	41-45	1.26-1.34	21-25
Poor	46-55	1.35-1.45	26.31
Very Poor	56-65	1.46-1.59	32-37
Very Very Poor	>66	>1.60	>38

TABLET HARDNESS TESTERS

1. Stokes-Monsanto - spring	**2. Strong-Cobb** - air pump / hydraulic pressure
3. Pfizer - pliers	**4. Erweka** - suspended weight
5. Schleuniger - most common - Motorized mill	- Horizontal position

#Criteria

Compressed tablet - 4-10kg	**Chewable tablet** 2-3kg
Buccal tablet - 7-10kg	

TABLET WEIGHT

1. Get 20 tablets	2. Weigh individually
3. Get average tablet weight	4. Determine the % variation

Average Tablet (mg)	% variation	
<130	10	*** Range:** LL = ave – (ave x var) UL = ave + (ave x var)
130-324	7.5	
>324	5	

#Criteria

- NMT 2 tablets are outside the acceptable tablet weight range
- No tablet is outside TWICE the acceptable % variation

FRIABILITY

$$\% = \frac{inital\ wt. - final\ wt.}{initial\ wt.}\ x\ 100$$

Sample size:
- If average tablet weigh ≤650mg, then weigh until 6.5g-6500mg
- If average tab with >650mg, then take 10 tablets

Criteria:
- No capping, chipping, cracking or obvious tablet breakage

Old: NMT 1%
New: 0.8%

DISINTEGRATION

Apparatus:	Basket Rack Assembly
Basket Rack Assembly:	29-32 cycles/min
Medium temp:	37± 2ºC
Sample size:	6 units (initial) + 12 units (retest)

#Criteria:
- Any residue of the unit is a soft moist mass having no palpably firm core
- If 1 or 2 failed to disintegrate, conduct retest
- **RETEST:** NMT 2 of the 18 units fail to disintegrate

IR tablet	30mins. in H_20	**Enteric-coated tablet** 1. 5 mins in H_20 2. 1hr in Simulated Gastric Fluid 3. Disintegrating in stimulated Intestial fluid
Buccal tablet	4hrs. in H_20	
Sublingual tablet	2-3mins. in H_20	

DISSOLUTION APPARATUS

		Stage	Sample	Criteria
I	Basket	S1	6	Each unit is NLTQ +5
II	Paddle			
III	Reciprocating Cylinder **(ThreeCip)**			
IV	Flow through Cell **(F4)**	S2	+ 6 = 12	Average NLTQ & no unit is <Q-15%
V	Paddle Over Disk			
VI	Revolving Cylinder	S3	+12 = 24	Average NLTQ, NMT 2 units are <Q-15% and no unit is <Q-25%
VII	Reciprocating Holder			

Media temp: **37± 0.5ºC**

SEDIMENTATION VOLUME

$$F = \frac{settled\ volume}{total\ vol.\ of\ suspension}$$

Ideal F = 1.0

DEGREE OF FLOCCULATION

$$\beta = \frac{ultimate\ F\ of\ floculated\ suspension}{ultimate\ F\ of\ defloculated\ suspension}$$

DEFLOCULATED	FLOCULATED
↓ Particle Size	↑ Particle Size
Slower rate settling	Faster rate settling
Prone to caking	Poor appearance

STERILITY TEST

Nutrient Media:	
a. Fluid Thioglycolate Medium	- Anaerobic bacteria (*Clostridium spp.)*
b. Soybean-Casein Digest Medium	- Aerobic bacteria *(Bacillus subtilis)* - Fungi *(Candida albicans)*

PYROGEN TEST

Sample size: 3 rabbits (initial) + 5 rabbits (retest)

#Criteria:

a. Each rabbit exhibits a temperature rise of <0.5ºC
b. If rabbit has a temperature rise of >0.5ºC, conduct retest

- **RETEST**
  i. NMT 3 rabbits each exhibit a temperature rise of > 0.5˚C
  ii. The total temperature rise for all rabbits is ≤ 3.5 º C

WORLD CLIMATIC CONDITIONS

Climatic Zone	Definition	Condition
I	Temperate	21ºC / 45% RH
II	Mediterranean / Subtropical	25ºC / 60% RH
III	Hot & Dry	30ºC / 35%RH
IVA	Hot & Humid	30ºC / 65%RH
IVB	Hot & Very Humid	30ºC / 65%RH

TYPES OF STABILITY STUDIES

1. Long term / Real-time Studies
Room Temp: **30 ± 2ºC / 75 ± 5% RH**
Ref: **5 ± 3ºC**
Testing period:
0,3,6,9,**12**,18,24,36
↓
Solid Dosage Form

2. Accelerated studies
Room Temp: **40 ± 2ºC / 75 ± 5% RH**
Ref: **25 ± 2ºC / 60 ± 5% RH**
Testing period:
0, **3**, 6 → **Stable for 2yrs.**
↓
Stable for 1 yr.

Quali-Quanti Chemistry

TITRIMETRIC ANALYSIS

1. Neutralization

a. Aqueous medium

	ACIDIMETRY	ALKALIMETRY
Titrant	**ACID** (HCl VS / H_2SO_4)	**BASE** (NaOH VS / KOH VS) *OH = Hydroxide
Analyte	**BASE** **Direct →** $NaHCO_3$, $KHCO_3$ *HCO3 = Bicarbonate **Residual →** ZnO, Milk of Magnesia	**ACID** **Direct →** dilute H_3PO4 **Residual →** Aspirin (old), HPLC (new)

CLASSIFICATION OF DYES

➢ AZO DYES

Indicator		Acid	Base
Methyl	RED	RED	YELLOW
	YELLOW		
	ORANGE	PINK	

➢ PTHALEINS

Indicator	Acid	Base
Phenolpthalein	Colorless	PINK
Thymolpthalein		BLUE

➢ SULFONPTHALEINS

Indicator	Acid	Base
Bromothymol Blue	YELLOW	BLUE
Bromophenol Blue		
Bromocresol Green		
Bromocresol Purple		PURPLE
Malachite Green		GREEN
Thymol Blue		BLUE
Phenol Red		RED
Cresol Red		

b. Non-aqueous medium

	ACIDIMETRY	ALKALIMETRY
Titrant	**Perchloric acid VS** (In Glacial Acetic acid & in Dioxane)	**Lithium Methoxide VS** **Sodium Methoxide VS** **Tetrabutyl Ammonium Hydroxide**
Standard	**KHP** (Potassium Hydrogen Pthalate)	**Benzoic acid**
Indicator	**Crystal violet** violet [base] → green [acid]	**Thymol Blue** (yellow → blue)
Analyte	**Weak base** **Ex.** Amines, Amine salts, Heterocyclic Nitrogen Compounds	**Weak acid** **Ex.** Acid halide, Acid anhydride

2. Reduction

	a. PERMANGANOMETRY	b. CERIMETRY
Titrant	**Potassium Permanganate** (OA)	**Ceric Sulfate VS** (OA)
Standard	**Sodium Oxalate**	Old: **As2O3** New: **Na Oxalate**
Indicator	**None** (self-indicating)	**Standardization:** none **Assay:** O-phenanthroline (**red** → **blue**)
Analyte	**RA + KMnO4** (**dark pink**) **Direct:** H_2SO_2 **Indirect:** Malic acid in cherry juice, TiO_2 **Residual:** $NaNO_2$, KNO_2, PbO	**RA** **Ex.** FeSO4, Menadion Na, Vit.K
Endpoint	**Pale pink** (15-30 secs.)	
Condition	Acidic H_2SO_4 and protected from light	

c. Iodine Method

	IODIMETRY	IODOMETRY
Type	**Direct**	**Indirect**
Titration w/	**I_2 directly**	**Liberated I_2 upon + KITS**
Titrant Std.	**Oxidizing Agent:** I_2 VS, $Na_2S_2O_3$	**Reducing Agent:** $Na_2S_2O_3$ VS K_2Cr_2O
	*** 2nd type:** $Na_2S_2O_3$ VS	
Analyte	**Reducing Agent**	**Oxidizing Agent**
	*** 2nd type:** I_2 sol'n, strong I_2 sol'n	
Indicator	**Starch TS**	**Starch TS**
Manner of addition	**Start of Titration**	**Before the endpoint**
Endpoint	**Colorless → Blue**	**Blue → Colorless**

Ex. Vit. C , Calomel, CuSO4, Antimony, NaOCl, Resorcinol, Tartrate, Phenol

a. Miscellaneous

i. Diazolization	Sulfonamide, Dapsone, Procaine & Tetracaine
ii. Dichlorophenol-Indophenol	Vit.C

3. Precipitation

	A. GAY-LUSAAC'S	B. LEIBIG	C. MODIFIED LEIBIG
Analyte	Halides	Cyanide	+ KITS = yellow turbidity + NH_3 = precipitation of $Ag[Ag(ON)_2]$ ppt
Titrant	$AgNO_3$ VS * AgCl white ppt * AgBr pale yellow * AgI yellow ppt	$AgNO_3$	
Indicator	none	none	
Endpoint	Cessation of Precipitation	Turbidity → $Ag[Ag(ON)_2]$ ppt	

d. Other Methods			
	MOHR	**FAJAN**	**VOLHARD**
Type	Direct	Direct	Residual
Titrant	$AgNO_3$ VS	$AgNO_3$ VS	$AgNO_3$ VS , NH_4SCN VS
Condition	pH 8	Dichlorofluorescein (DCF) = pH 4 Eosin Y = pH 2-3	Acidic
Indicator	K_2CrO_7		$Fe(NH_4)(SO_4)_2$
Analyte	Halides	Halides	Halides
Endpoint	Red ppt Ag_2CrO_4	Pink surface of ppt AgX : Ag - ind	Orange-tinge in supernatant liquid $Fe(SCN)^{2+}$`

4. Complex			
	Ca^{2+}	**Mg^{2+}, Mn^{2+}, Zn^{2+}**	**Al^{3+}**
Type	Direct	Direct	Residual
Titrant	Na_2 EDTA	Na_2 EDTA	$ZnSo_4$
Condition	pH 12-13	pH 10	pH4-6
Indicator	Hydroxynapthol blue	Eriochrome black	Dithizole
Endpoint	Red (Complex) → Blue (Free)	Wine Red/Purple → Blue	Free: Purplish Green → Pink (Complex)

Electromagnetic Spectrum				
Region		Wavelength		
Ultraviolet		180 - 380nm		
Visible		380 - 780nm		
INFRARED	Near	780 - 3000nm		
	Mid	3μm - 15μm	Freq - 3-8μm	Finger – 8-16μm
	Far	15μm - 30μm		

Iodine Value Classification			
	IV	**Example**	
Drying oils	> 120	Linseed, Cod Liver oil	**Dry ung LiCod**
Semi-drying oils	100-120	Cotton seed, Sesame oil	**Semi-Cotse**
Non-drying oils	< 100	Olive, Almond oil	**NOA**

DRYING vs. IGNITION			**" Very Demanding BaYaW "**	
	DRYING	**IGNITION**	Flame Color	Temp.
Equipment	Oven	Furnace	**V**ery Dull Red	500 - 550
Temperature	110-120˚C	800 ± 25ºC	**D**ull Red	550 - 700
Vessel	Evap dish/ weighing bottle	Crucible (open)	**B**right Red	800 - 1000
Time period	1 hr	15 mins.	**Y**ellow Red	1000 - 1200
Endpoint	Constant weight	Constant weight	**W**hite	1200 - 1600

TITRATION (FORMULAS)		
Direct / Indirect:	$\%P = \frac{N\ x\ V\ x\ (\frac{MW}{f\ x\ 1000})}{sample\ wt.(g)}\ x\ 100$	**Normality = M x f**
Direct w/ blank:	$\%P = \frac{N\ x\ (Va - Vb)\ x\ (\frac{MW}{f\ x\ 1000})}{sample\ wt.(g)}\ x\ 100$	
Residual:	$\%P = \frac{[(N1V1) - (N2V2)\ x\ (\frac{MW}{f\ x\ 1000})}{sample\ wt.(g)}\ x\ 100$	**N = Normality** **V = Volume**
Residual w/ blank:	$\%P = \frac{N2\ x\ (V2b - V2a)\ x\ (\frac{MW}{f\ x\ 1000})}{sample\ wt.(g)}\ x\ 100$	**V2 – back titrant**
*** f = Equivalence factor**		

GRAVIMETRY	$\%P = \frac{wt.\ residue}{wt.\ sample}\ x\ \frac{MW\ sample}{MW\ residue}\ x\ 100$
SPECTROMETRY	$\frac{abs.std.}{conc.std.}\ x\ \frac{abs.sx}{conc.sx}$
CHROMATOGRAPHY	$Rf = \frac{distance\ travelled\ by\ solute}{distance\ travelled\ by\ solvent}$
IODINE VALUE	$Rf = \frac{N2\ x\ (V2b - V2a) x\ 0.1269}{sample\ wt.(g)}\ x\ 100$
PHENOL CONTENT DETERMINATION	$\%P = \frac{Vsample - Vresidue}{Vsample}\ x\ 100$
% MOISTURE CONTENT	$\%MC = \frac{Vsample - Vresidue}{Vsample}\ x\ 100$
TOTAL ASH CONTENT	$\%\ TA = \frac{wt.of\ total\ ash}{wt.of\ crude\ drug}\ x\ 100$
NORMALITY	$N = \frac{\frac{wt.(g)}{MW/f}}{L}$
ACID VALUE (mg/g)	$AV = \frac{N\ x\ V\ x\ MW}{wt.(g)}$

FLAME TEST		
Element	**W/ Cobalt**	**W/O Cobalt**
Na	**Nil / Nothing**	**Persistent Golden Yellow**
K	**Crimson Red**	**Violet**
Ca	**Light green**	**Brick red**
Sr	**Purple**	**Crimson Red**
Ba	**Bluish green**	**Yellowish-green**
Lithium		**Carmine Red**
Borates, Cu, Tl		**Green**
Pb, As, Sb, Bi		**Blue**

COLOR OF PRECIPITATED SULFIDE	
Element	**Color**
Ca^{+2}, Sn^{+2} (brown), As^{+3}, As^{+5}	**Yellow**
Sb^{+3}, Sb^{+5} (orange-red)	**Orange**
Zn^{+2}	**White**
Mn^{+2}	**Pink**
Cu^{+2}, Bi^{+2}, Pb^{+2}, Sn^{+4} Hg^{+2}, Co^{+2}, Ni^{+2}, Ag^{+2}, Fe^{+2}	**Black**

QA	QC
- assures that policies are followed	- test compliance of RM and PM
- cooperate w/ regulatory agencies	- Performs IPQC
- prepare SOPS	- Monitors environmental procedures
- audit and monitoring	

MICROBIOLOGY

GRAM POSITIVE	
Catalase **(-)**, Bile Optochin **(-)**	**Viridan**
Catalase **(-)**, Bile Optochin **(+)**	***Strep. pneumonia***
Catalase **(-)**, Bacitracin **(-)**	***Strep. agalactiae***
Catalase **(-)**, Bacitracin **(+)**	***Strep. piyogenes***
Catalase **(-)**, 6.5 NaCl **(-)**	***Strep. bovis***
Catalase **(-)**, 6.5 NaCl **(-)**	**Enterococci**
Catalase **(+)**, Coagulase **(+)**	***Staph. Aureus***
Catalase **(+)**, Coagulase **(-)**, Novobiocin **(-)**	***Stap. saphrophyticus***
Catalase **(+)**, Coagulase **(-)**, Novobiocin **(+)**	***Stap. epidermis***

GRAM-STAINING (VIAS)		ACID FAST STAIN (CHAM)	
Crystal Violet	Primary stain	**C**arbolfuschin	Primary stain
Iodine	Mordant	**H**eat	Mordant
Acid alcohol	Decolorizer	**A**cid alcohol	Decolorizer
Safranin	Counter stain	**M**ethylene blue	Counter stain

RNA +/- sense			
RNA (+) sense		**RNA (-) sense**	
"na PiCoT Ca ni FlaRe kaya positive"		**"Always Bring Polymerase Or Fail Replication"**	
Picorna	**Ca**lici	Arena	**O**rthomyxo
Corona	**Fla**vi	Bunya	**F**ilo
Toga	**Re**tro	Paramyxo	**R**habdo

Hypersensitivity reactions			
"Si Ana at Toto may Complex relationship sa Cell lang nag-uusap"			
I	**Ana**phylactic	IgE	Penicillins & Cephalosporins
II	Cy**toto**xic	IgG & IgM	Blood dyscrasia
III	Immune-**Complex**	Igb	Serum sickness
IV	**Cell**-mediated	T cells	Contact dermatitis

Encapsulated Pathogens	
"Even Some Super Serial Killers Have Pretty Nice Big and Bulging Capsules"	
E.coli	**P.**auroginosa
S.pneumonia	**N.**meningitidis
S.pyogenes	**B.**anthracis
S.typhii	**B.**pertusis
K.pneumonie	**C.**neoformans
H.influenzae	

Naked Viruses	
Give PAPP smear and CPR to a naked Hippie	
DNA	**RNA**
Papillomavirus	**C**alicivirus
Adenovirus	**P**icornavirus
Parvovirus	**R**eovirus
Polyomavirus	**H**epevirus

"-cidal" Antibiotics		
"Very Finely Profficient At Cell Murder"		
Vancomycin	**P**enicillin	**C**ephalosporin
Flouroquinolones	**A**minoglycoside	**M**etronidazole

Viral Vaccine		
Live-attenuated	**Killed-attenuated**	**Recombinant**
MMR	**R**abies	**H**epatitis B (Recombinant HBsAg)
Influenza	**I**nfluenza	
Smallpox	**S**alk Polio Virus	**H**PV Type 6,11,16,18
Sabin Polio Virus	Hepatitis **A**	
Chicken Pox (Varicella)	*** IM injection = live attenuated**	
Rotavirus		
Yellow Fever		

WHO Dates	
March 24	World TB Day
April 7	World **Health** Day
April 24-30	World **Immunization** Days
September 28	World **Rabies** Day
December 1	World **AIDS** Day
July 28	World **Hepatitis** Day
May 17	World **Hypertension** Day
April 25	World **Malaria** Day

HERPES SIMPLEX VIRUS	
I	*Herpes Labialis* (herpetic keratitis & encephalitis)
II	*Herpes Genitalis*
III	*Varicella Zoster* (child: chicken pox) (adult: Zoster – Shingles)
IV	*Ebstein-Barr Virus*
V	*Cytomegalovirus*
VI	Roseola 6th dse (*Exanthema subitum)*
VIII	Kaposi Sarcoma

Expanded Program on Immunization				
Birth	BCG		Hepa B	
6 wks.	OPV 1		Penta	PCV
10 wks.	OPV 2	Rota 1	Penta	PCV
14 wks.	OPV 3	Rota 2	Penta	PCV
9 mos.	Measles			
12 mos.	Measles			

ANTI-TUBERCULOSIS DRUGS		
DRUGS	**MOA**	**ADVERSE EFFECTS**
Rifampicin	Inhibits RNA synthesis	Orange/Red discoloration of secretions
Isoniazid	Inhibits synthesis of Mycolic acid	Peripheral Neuropathy (Vit. B6)
Pyrazinamide	Unknown	Hepatotoxic
Ethambutol	Inhibit incorporation of Mycolic acid & RNA synthesis	Optic neuritis (Red & Green blindness)
Streptomycin	Effective for extracellular bacilli	Vestibulotoxic

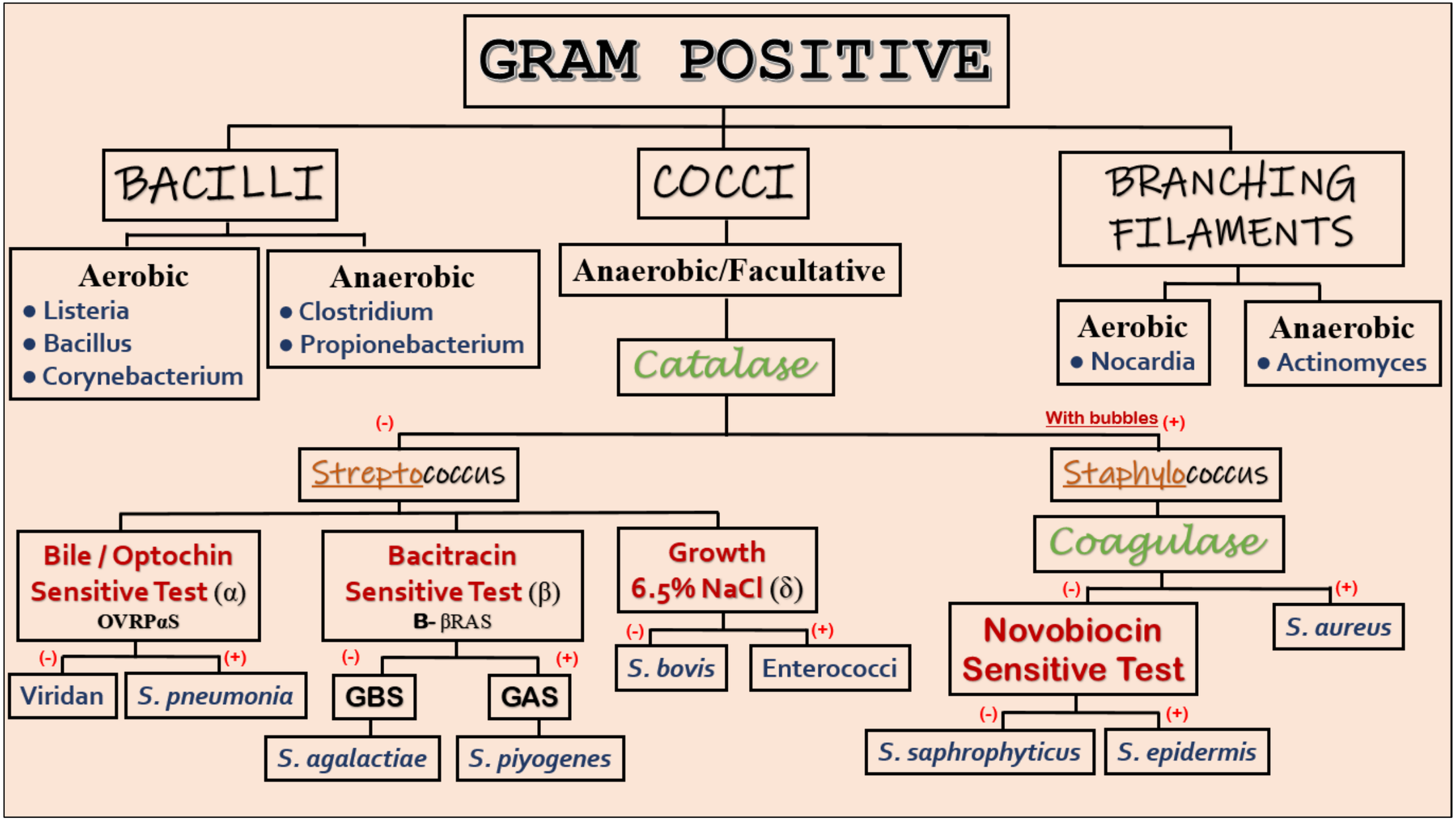
Lancefield Grouping	
Group	
A	*Streptococcus pyogenes* Causes: Scarlet Fever, Pharyngitis, Impetigo, Rheumatic Heart Fever, Acute Glumerulonephritis
B	*Streptococcus agalactiae*
C	α haemolytic – *Streptococci*
D	*Enterococcus faecalis & faecium* *Streptococcus bovies*
	Unclassified Strep: *S.pneumonia, S. sanguis, S. mutans*

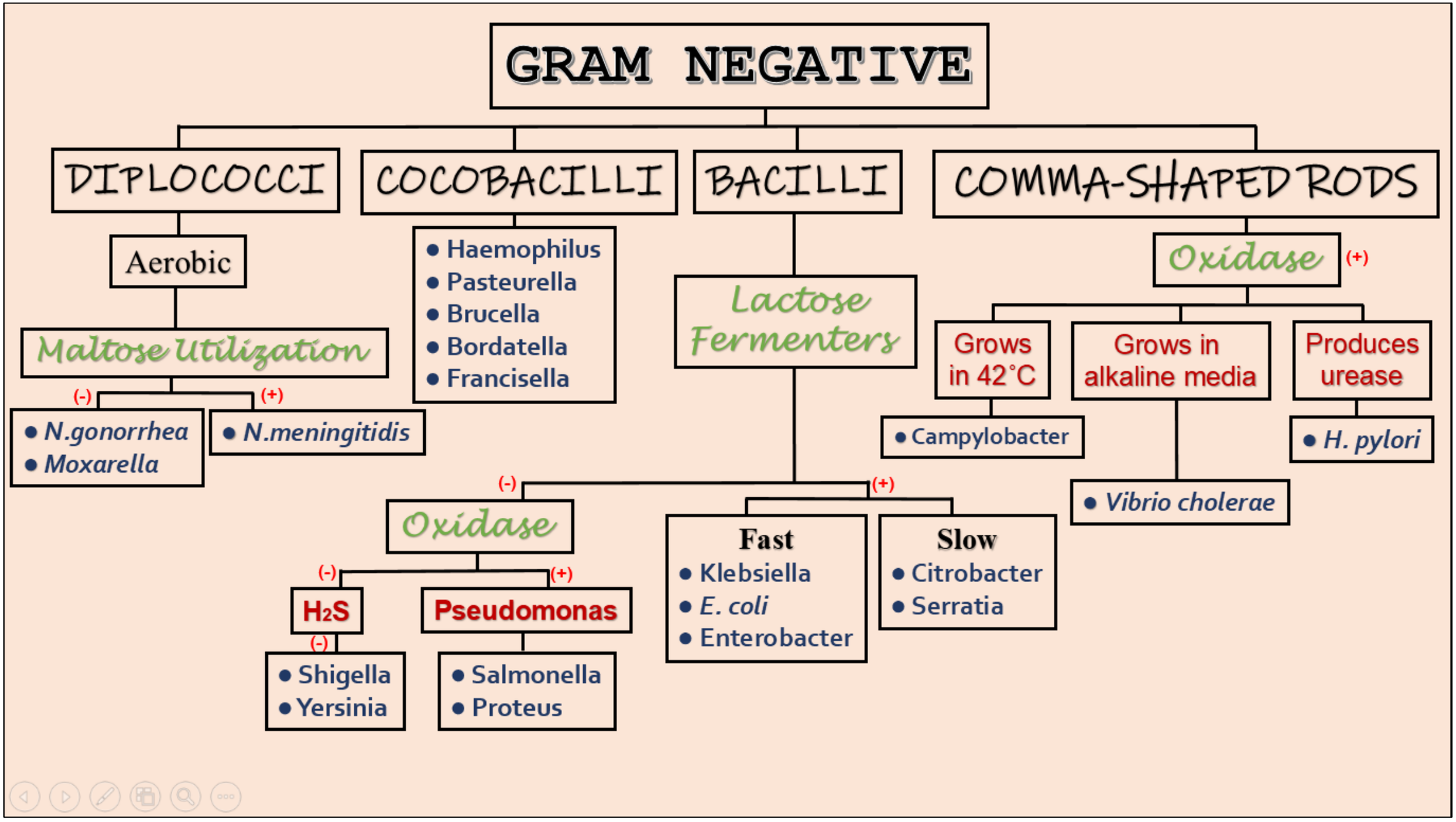
Health Indicators	
1. **Fertility Rate**	$\boldsymbol{Crude\ Birth\ Rate = \frac{Registered\ Live\ Birth}{Total\ Midyear\ Population}\ x\ 1000}$
	$\boldsymbol{General\ Fertility\ Rate = \frac{Registered\ Live\ Birth}{Midyear\ population\ of\ 15-49\ y.o\ (women)}\ x\ 1000}$
2. **Mortality Rate**	$\boldsymbol{Crude\ Death\ Rate = \frac{Total\ \#\ of\ death}{Total\ \#\ of\ population}\ x\ 1000}$
	$\boldsymbol{Specific\ Death\ Rate = \frac{\#\ of\ deaths\ due\ to\ specific\ cause}{Total\ population\ involved}\ x\ 1000}$
	$\boldsymbol{Infant\ Mortality\ Rate = \frac{\#\ of\ infant\ death}{\#\ of\ Live\ birth}\ x\ 1000}$
	$\boldsymbol{Proportionate\ Mortality\ Rate = \frac{\#\ of\ deaths\ from\ TB}{\#\ of\ deaths\ from\ all\ causes}\ x\ 1000}$
	$\boldsymbol{Case\ fatability\ Rate = \frac{\#\ of death\ from\ a\ specific\ disease}{\#\ of\ causes\ of\ the\ same\ disease}\ x\ 1000}$

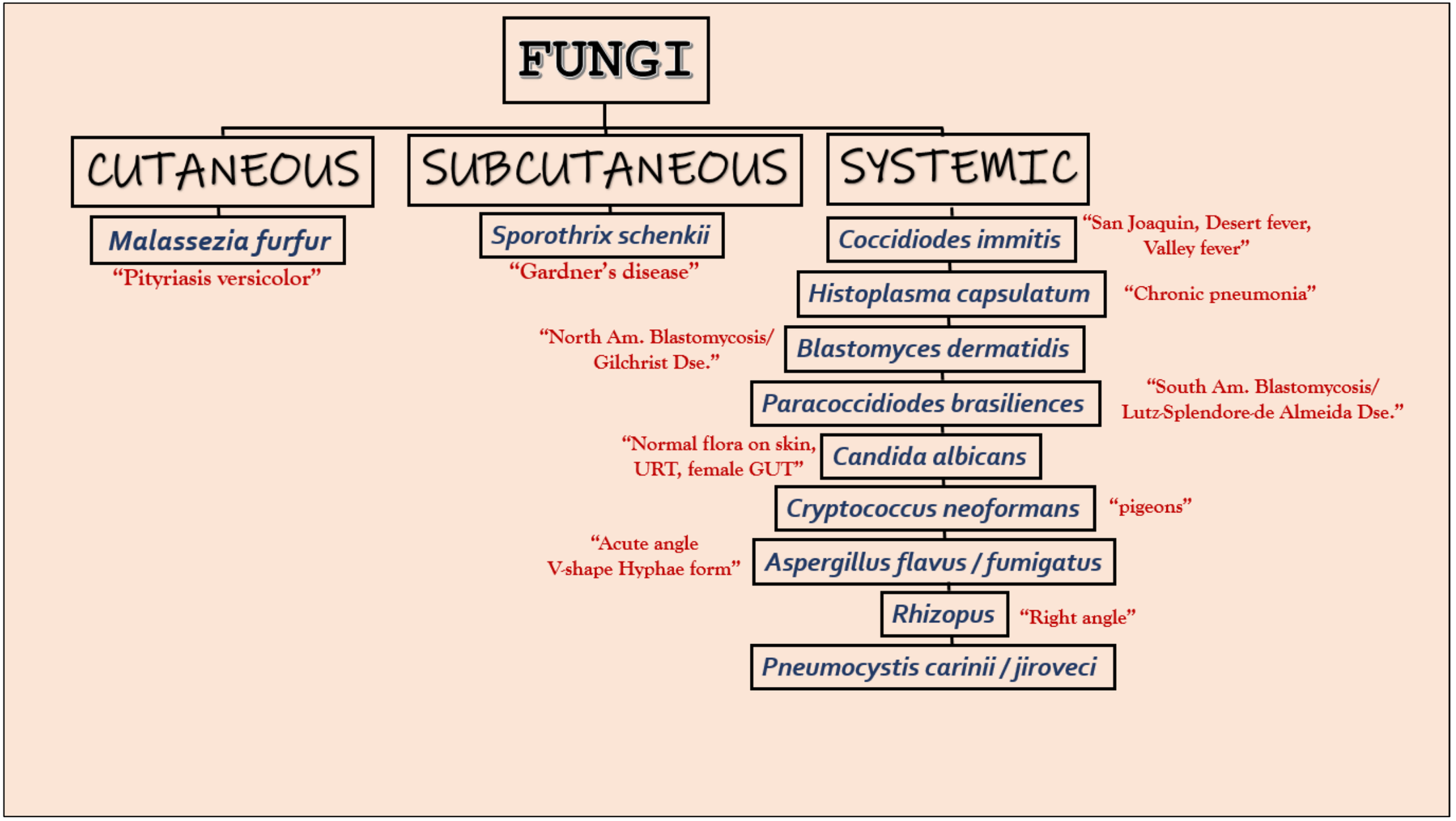
MULTIDRUG RESISTANCE NOSOCOMIAL PATHOGENS	
E	*Enterococcus faecalis*
S	*Staphylococcus aureus*
K	*Klebsiella pneumonia*
A	*Acinetobacter baumanni*
P	*Pseudomonas aeruginosa*
E	*Enterobacter spp.*

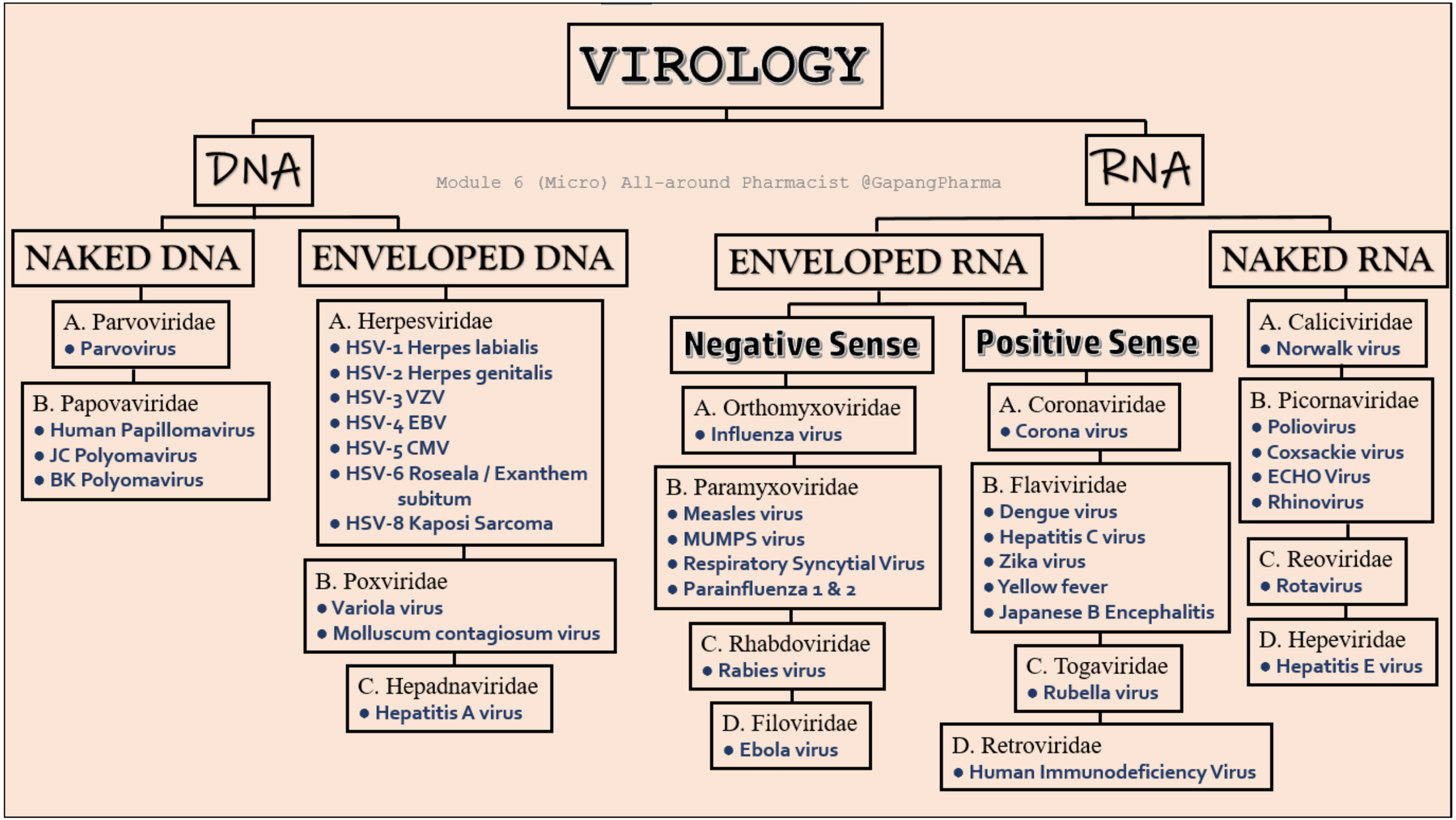
Plasmodium spp → Malaria		
P.falciparum	***P.malariae***	***P. ovale / vivax***
48h	72h	48h
Tertian	Quartan	Tertian
Malignant	Benign	Benign
All RBC	Old RBC	Young RBC “reticulocytes”

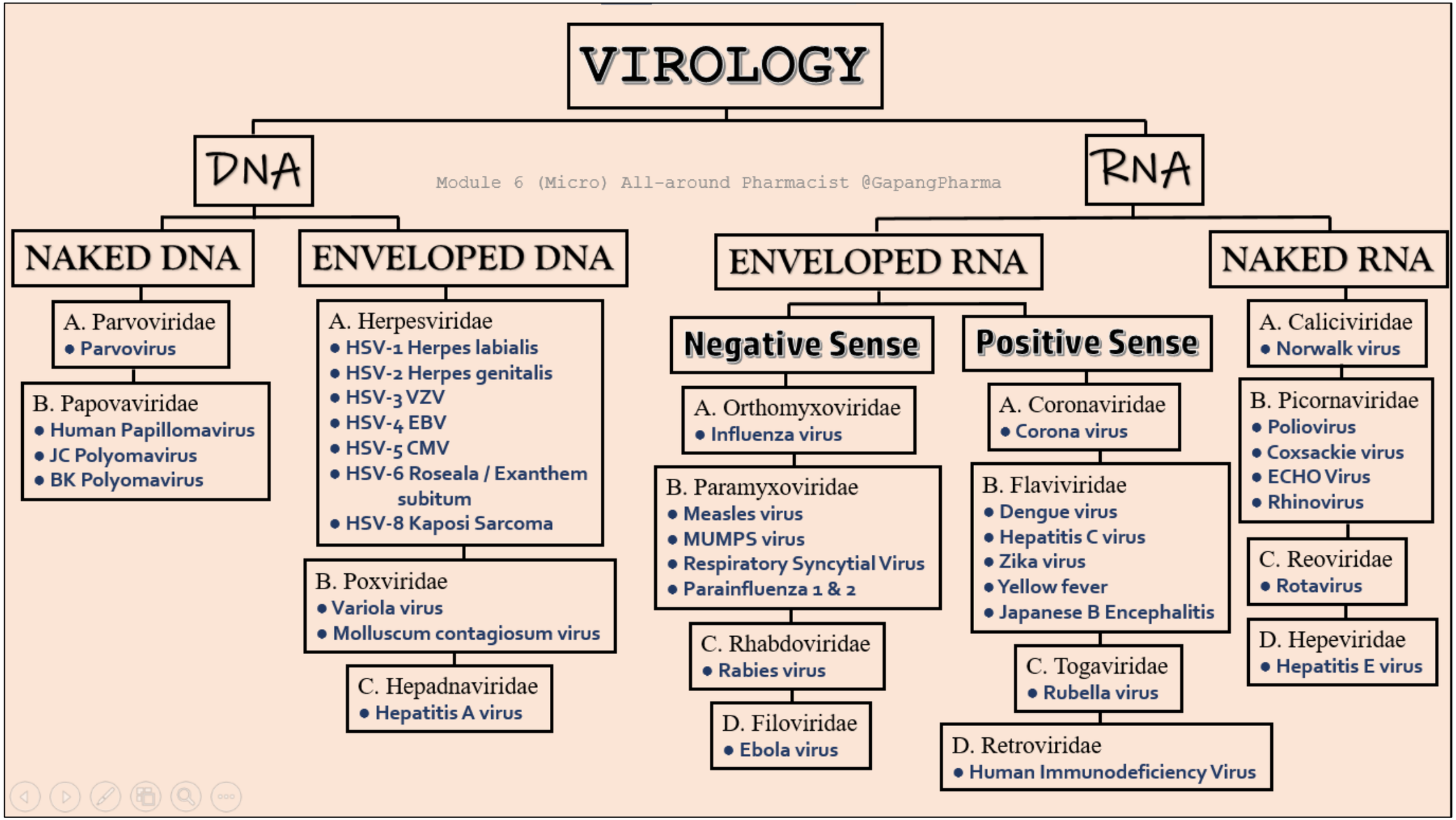
Product	Contaminant
Antiseptic Mouthwash	Coliforms
Surgical dressing	Clostridium spp.
IV fluids	Pseudomonas, Erwinia, & Enteriobacter
Plague vaccine Talcum powder	*Clostridium tetani*
Hand cream	*Klebsiella pneumonia*
Flourescein eye drops Chloroxylenol disinfectant Antibiotic eye ointment Peppermint water Iodophor solution Thymol mouthwash	*Pseudomonas aeruginosa*
Chlorhexidine-Cefrimide Antiseptic solution	*Pseudomonas cepacia*
Aqueous soap	*Pseudomonas stutzeri*
Serum vaccine	*Staphylococcus aureus*
Thyroid tablets	*S. muenchen*
Carmine powder	*S. cubada*
Saline solution	*Serratia marcescens*
Contact lens solutions	Serratia & Enterobacter


GRAM POSITIVE
BACILLI
Aerobic
• Listeria
• Bacillus
• Corynebacterium
Anaerobic
• Clostridium
• Propionebacterium
COCCI
Anaerobic/Facultative
Catalase
(-)
Streptococcus
Bile / Optochin Sensitive Test (α)
OVRPαS
(-)
Viridan
(+)
S. pneumonia
Bacitracin Sensitive Test (β)
B- βRAS
(-)
GBS
S. agalactiae
(+)
GAS
S. piyogenes
Growth 6.5% NaCl (δ)
(-)
S. bovis
(+)
Enterococci
With bubbles (+)
Staphylococcus
Coagulase
(-)
Novobiocin Sensitive Test
(-)
S. saphrophyticus
(+)
S. epidermis
(+)
S. aureus
BRANCHING FILAMENTS
Aerobic
• Nocardia
Anaerobic
• Actinomyces


GRAM NEGATIVE
DIPLOCOCCI
COCOBACILLI
BACILLI
COMMA-SHAPED RODS
Aerobic
Maltose Utilization
(-)
(+)
N.gonorrhea
Moxarella
N.meningitidis
Haemophilus
Pasteurella
Brucella
Bordatella
Francisella
Lactose Fermenters
Oxidase
(+)
Grows in 42°C
Grows in alkaline media
Produces urease
Campylobacter
Vibrio cholerae
H. pylori
(-)
(+)
Oxidase
(-)
(+)
H2S
Pseudomonas
(-)
Shigella
Yersinia
Salmonella
Proteus
Fast
Klebsiella
E. coli
Enterobacter
Slow
Citrobacter
Serratia


FUNGI
CUTANEOUS
SUBCUTANEOUS
SYSTEMIC
Malassezia furfur
"Pityriasis versicolor"
Sporothrix schenkii
"Gardner's disease"
Coccidiodes immitis
"San Joaquin, Desert fever, Valley fever"
Histoplasma capsulatum
"Chronic pneumonia"
"North Am. Blastomycosis/ Gilchrist Dse."
Blastomyces dermatidis
Paracoccidiodes brasiliences
"South Am. Blastomycosis/ Lutz-Splendore-de Almeida Dse."
"Normal flora on skin, URT, female GUT"
Candida albicans
Cryptococcus neoformans
"pigeons"
"Acute angle V-shape Hyphae form"
Aspergillus flavus / fumigatus
Rhizopus
"Right angle"
Pneumocystis carinii / jiroveci


VIROLOGY
DNA
RNA
Module 6 (Micro) All-around Pharmacist @GapangPharma
NAKED DNA
A. Parvoviridae
• Parvovirus
B. Papovaviridae
• Human Papillomavirus
• JC Polyomavirus
• BK Polyomavirus
ENVELOPED DNA
A. Herpesviridae
• HSV-1 Herpes labialis
• HSV-2 Herpes genitalis
• HSV-3 VZV
• HSV-4 EBV
• HSV-5 CMV
• HSV-6 Roseala / Exanthem subitum
• HSV-8 Kaposi Sarcoma
B. Poxviridae
• Variola virus
• Molluscum contagiosum virus
C. Hepadnaviridae
• Hepatitis A virus
ENVELOPED RNA
Negative Sense
A. Orthomyxoviridae
• Influenza virus
B. Paramyxoviridae
• Measles virus
• MUMPS virus
• Respiratory Syncytial Virus
• Parainfluenza 1 & 2
C. Rhabdoviridae
• Rabies virus
D. Filoviridae
• Ebola virus
Positive Sense
A. Coronaviridae
• Corona virus
B. Flaviviridae
• Dengue virus
• Hepatitis C virus
• Zika virus
• Yellow fever
• Japanese B Encephalitis
C. Togaviridae
• Rubella virus
D. Retroviridae
• Human Immunodeficiency Virus
NAKED RNA
A. Caliciviridae
• Norwalk virus
B. Picornaviridae
• Poliovirus
• Coxsackie virus
• ECHO Virus
• Rhinovirus
C. Reoviridae
• Rotavirus
D. Hepeviridae
• Hepatitis E virus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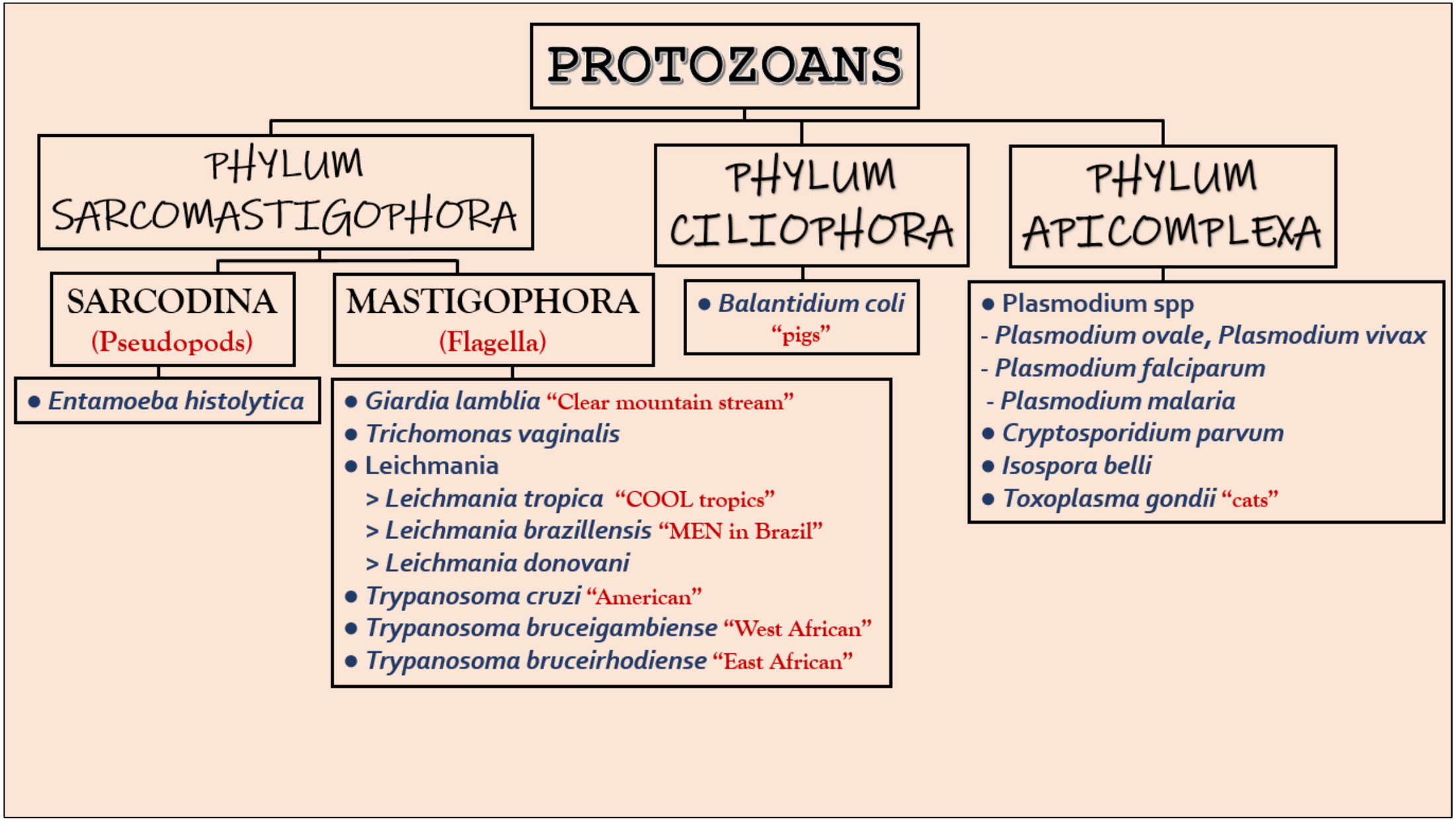
PROTOZOANS
PHYLUM SARCOMASTIGOPHORA
SARCODINA (Pseudopods)
MASTIGOPHORA (Flagella)
PHYLUM CILIOPHORA
PHYLUM APICOMPLEXA
• Entamoeba histolytica
• Giardia lamblia "Clear mountain stream"
• Trichomonas vaginalis
• Leichmania
> Leichmania tropica "COOL tropics"
> Leichmania brazillensis "MEN in Brazil"
> Leichmania donovani
• Trypanosoma cruzi "American"
• Trypanosoma bruceigambiense "West African"
• Trypanosoma bruceirhodiense "East African"
• Balantidium coli "pigs"
• Plasmodium spp
- Plasmodium ovale, Plasmodium vivax
- Plasmodium falciparum
- Plasmodium malaria
• Cryptosporidium parvum
• Isospora belli
• Toxoplasma gondii "cats"

METAZOANS

PHYLUM PHALTYHELMINTHES (FLATWORMS)

CESTODES (Tapeworm)

"Cestapes"

- *Taenia solium*
- *Taenia saginata*
- *Diphyllobothrium latum*
- *Hymenolepsis nana*
- *Echinococcus granulosis*
- *Dipylidium caninum*

TREMATODES (Flukes)

I. Blood

- Schistosoma
  - *Schistosoma japonicum* "East Asia"
  - *Schistosoma mansoni* "Africa, South America"
  - *Schistosoma heamatobium* "Africa"

II. Lung

- *Paragonimus westermanii* "Oriental Lung Fluke"

"Chinese Liver Fluke /Undecooked fish"

III. Liver

- *Clonorchis sinensis*
- *Fasciola hepatica*

"Giant intestinal fluke"

III. Intestinal

- *Fasciolopsis buski*

PHYLUM NEMATODA (ROUNDWORM)

A. Intestinal

- *Ascaris lumbricoides* "Giant ring worm"
- *Ancylostoma duodenale* "Old-Ancient"
- *Necator americanus* "New,Necutter"
- *Strongyloides stercolaris* "Threadworm"
- *Trichiniella spirales* "samgyup"
- *Trichuris trichiura* "Whipworm"
- *Enterobeous vermicularis* "Pinworm"
- *Capillaria philippinensis* "Pudoc worm"

B. Blood & Tissue

- Lymphatic Filarial Parasite
  - > *Onchocera volvulus*
  - > *Wuncheria bancrofti* & *Brugia malayi*
    - "Africa"
    - "SouthEast Asia"
  - > *Dracunculus medinensis* "Guinea fire worm"