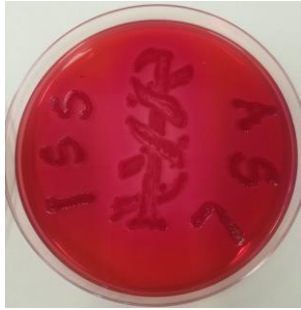


ALTERNANZA SCUOLA·LAVORO IN ISS



04-15 Marzo 2019



Percorso formativo:

BC30 Come il laboratorio di microbiologia ci aiuta a riconoscere i batteri dannosi per l'uomo e a limitare la loro diffusione.

Studenti:

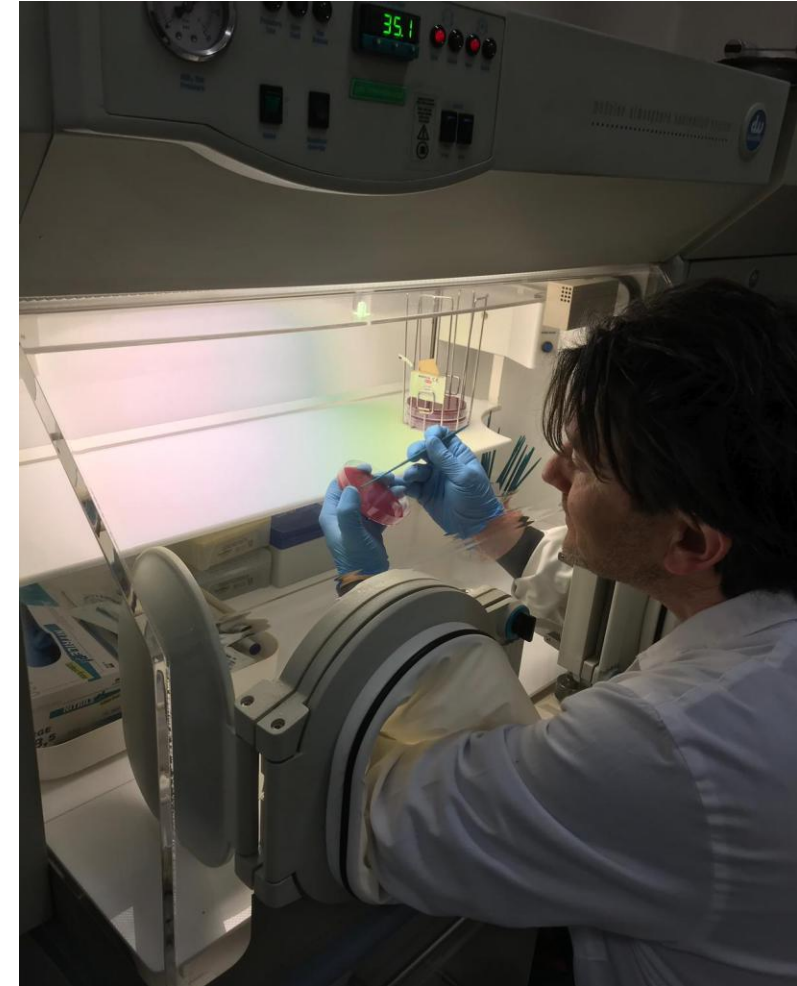
**ABBALLE EDOARDO- LICEO DE SANCTIS 3AS
AMORE CARLOTTA- LICEO GESU' MARIA 4AC
CORTI ALESSIA- LICEO ARISTOFANE 3DC**

Tutor:

**CERQUETTI MARINA
SPIGAGLIA PATRIZIA
GIUFRE' MARIA
BARBANTI FABRIZIO**

**DIPARTIMENTO MALATTIE INFETTIVE
Reparto AS-PS**

Osservazione di batteri patogeni



Quando un batterio è «cattivo»?

- Produzione di tossine
- Antibiotico resistenza
- Capacità di causare infezione

Analisi fenotipica

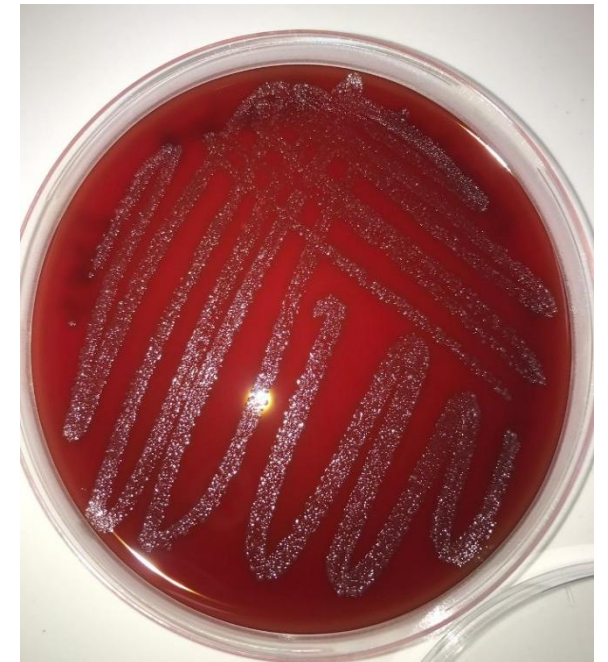
Osservazione delle piastre coltivate a 37°C e della morfologia delle colonie

Semina di batteri provenienti da varie parti del corpo e dall'ambiente.

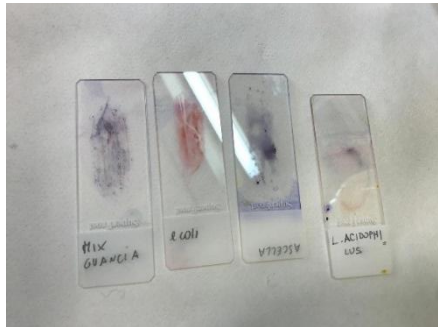


In aerobiosi

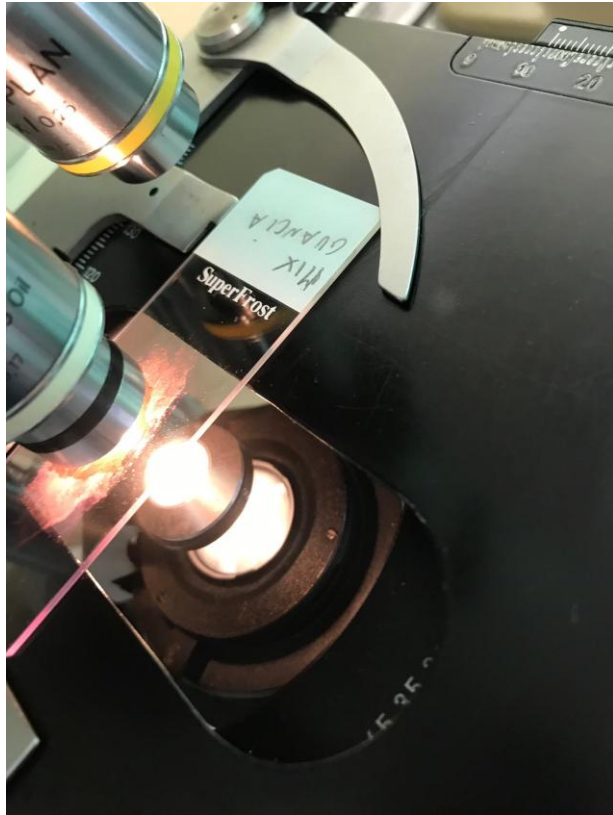
In anaerobiosi



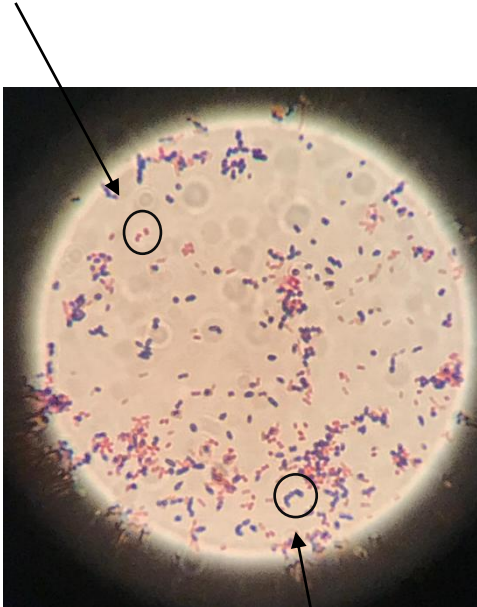
Preparazione di vetrini e colorazione di Gram



Osservazione dei vetrini al microscopio ottico

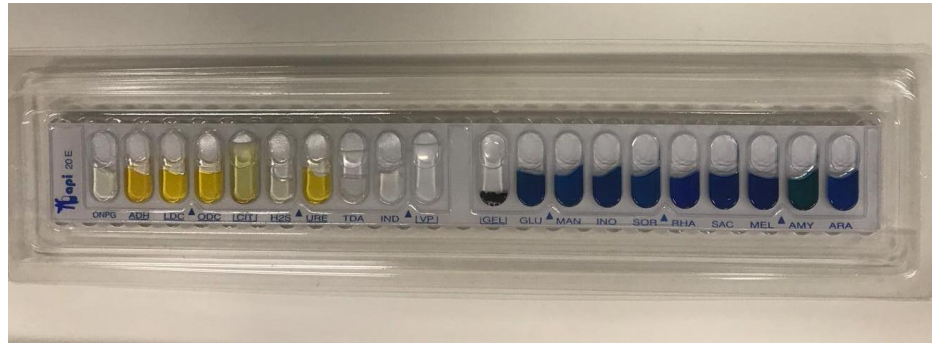


Gram -

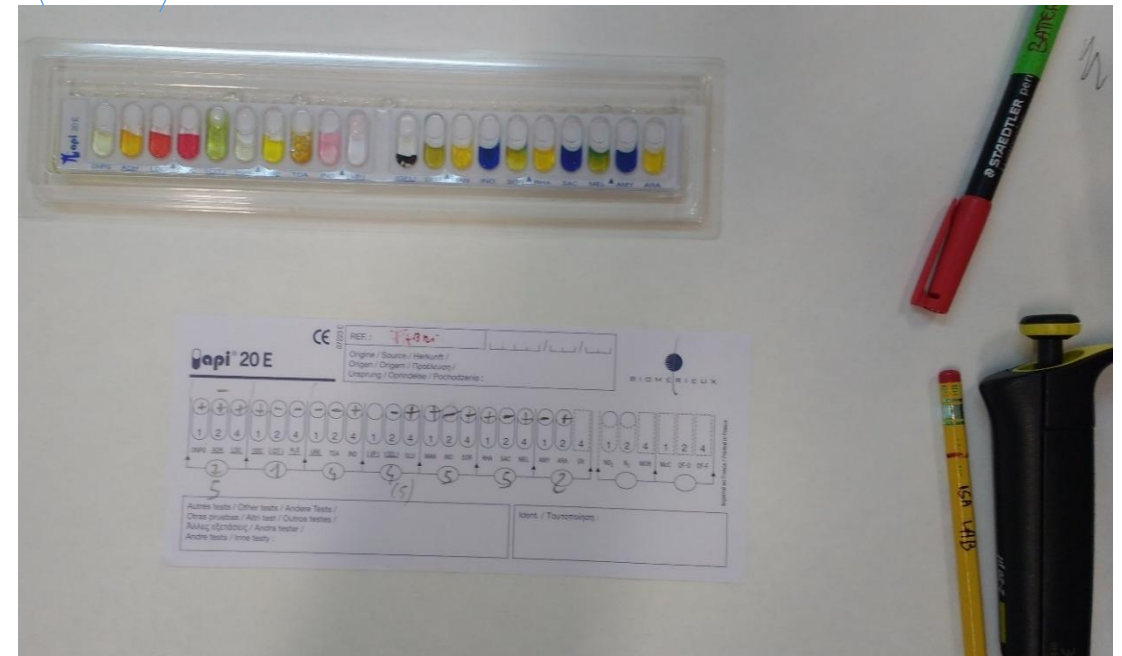


Gram +

Identificazione fenotipica di specie con galleria Api



Il substrato cambia colore quando avviene una reazione biochimica

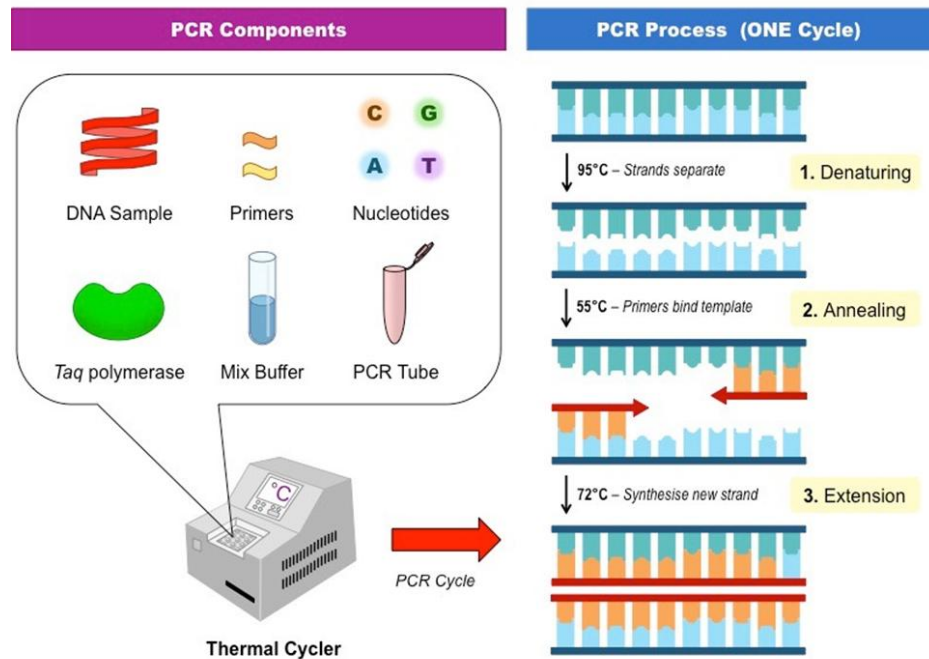
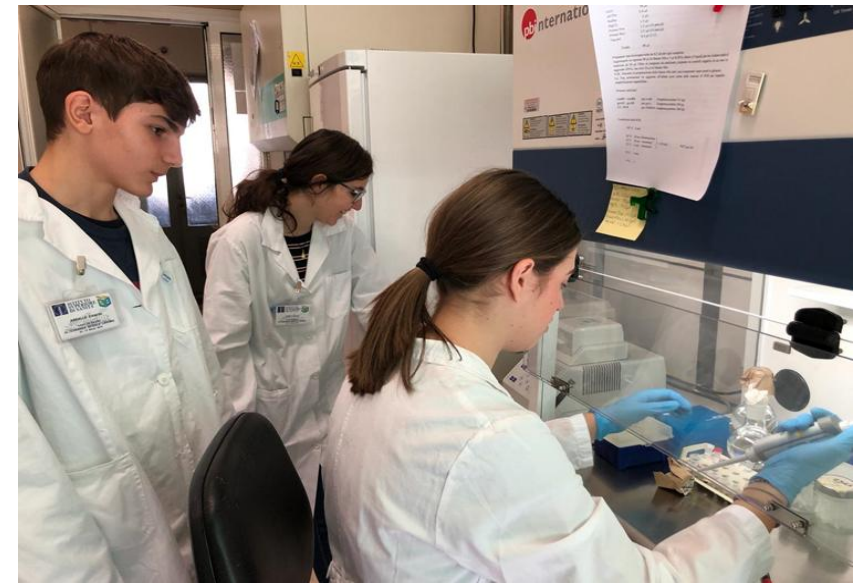


24h dopo

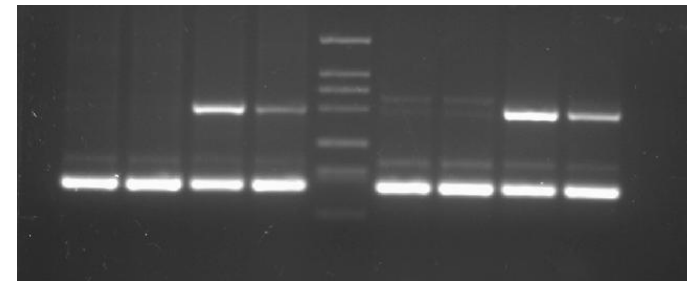
api 20 enterobacteriaceae		INTERPRETATION OF BIOCHEMICAL TESTS	
NEGATIVE	POSITIVE	NEGATIVE	POSITIVE
ONPG GALACTOSIDASE ONPG is hydrolyzed to ONP and galactose. ONP is colorless, galactose is colorless. ONPG is colorless, galactose is colorless.			
ADH ACETYLPHOSPHATE HYDROLASE ADH is hydrolyzed to acetate and phosphate. Acetate is colorless, phosphate is colorless. ADH is colorless, phosphate is colorless.			
LDC TRYPTOPHAN DEAMINASE LDC is hydrolyzed to indole and pyruvate. Indole is colorless, pyruvate is colorless. LDC is colorless, pyruvate is colorless.			
ODC TRYPTOPHAN DEAMINASE ODC is hydrolyzed to indole and pyruvate. Indole is colorless, pyruvate is colorless. ODC is colorless, pyruvate is colorless.			
LCTI TRYPTOPHAN DEAMINASE LCTI is hydrolyzed to indole and pyruvate. Indole is colorless, pyruvate is colorless. LCTI is colorless, pyruvate is colorless.			
H2S HYDROGEN SULFIDE PRODUCTION H2S is produced from sulfur and water. H2S is colorless, sulfur is colorless. H2S is colorless, sulfur is colorless.			
UBE UREASE UBE is hydrolyzed to ammonia and carbon dioxide. Ammonia is colorless, carbon dioxide is colorless. UBE is colorless, carbon dioxide is colorless.			
TDA TRYPTOPHAN DEAMINASE TDA is hydrolyzed to indole and pyruvate. Indole is colorless, pyruvate is colorless. TDA is colorless, pyruvate is colorless.			
IND INDOLE PRODUCTION IND is produced from tryptophan. Indole is colorless, tryptophan is colorless. IND is colorless, tryptophan is colorless.			
LYP LYSINE DECARBOXYLASE LYP is hydrolyzed to cadaverine and CO2. Cadaverine is colorless, CO2 is colorless. LYP is colorless, CO2 is colorless.			
GELI GELATINASE GELI is hydrolyzed to amino acids and glycerol. Amino acids are colorless, glycerol is colorless. GELI is colorless, glycerol is colorless.			
GLU GLUCONATE DEHYDROGENASE GLU is hydrolyzed to gluconate and CO2. Gluconate is colorless, CO2 is colorless. GLU is colorless, CO2 is colorless.			
MAN MANNITOL DEHYDROGENASE MAN is hydrolyzed to mannitol and CO2. Mannitol is colorless, CO2 is colorless. MAN is colorless, CO2 is colorless.			
INO INOSITOL DEHYDROGENASE INO is hydrolyzed to inositol and CO2. Inositol is colorless, CO2 is colorless. INO is colorless, CO2 is colorless.			
SOR SORBITOL DEHYDROGENASE SOR is hydrolyzed to sorbitol and CO2. Sorbitol is colorless, CO2 is colorless. SOR is colorless, CO2 is colorless.			
RHA RHAMNOSIDASE RHA is hydrolyzed to rhamnose and CO2. Rhamnose is colorless, CO2 is colorless. RHA is colorless, CO2 is colorless.			
SAC SACCHARASE SAC is hydrolyzed to sucrose and CO2. Sucrose is colorless, CO2 is colorless. SAC is colorless, CO2 is colorless.			
MEL MELTANSE MEL is hydrolyzed to melibiose and CO2. Melibiose is colorless, CO2 is colorless. MEL is colorless, CO2 is colorless.			
AMY AMYLASE AMY is hydrolyzed to dextrin and CO2. Dextrin is colorless, CO2 is colorless. AMY is colorless, CO2 is colorless.			
ARA ARABINOSIDASE ARA is hydrolyzed to arabinose and CO2. Arabinose is colorless, CO2 is colorless. ARA is colorless, CO2 is colorless.			

Analisi genotipica

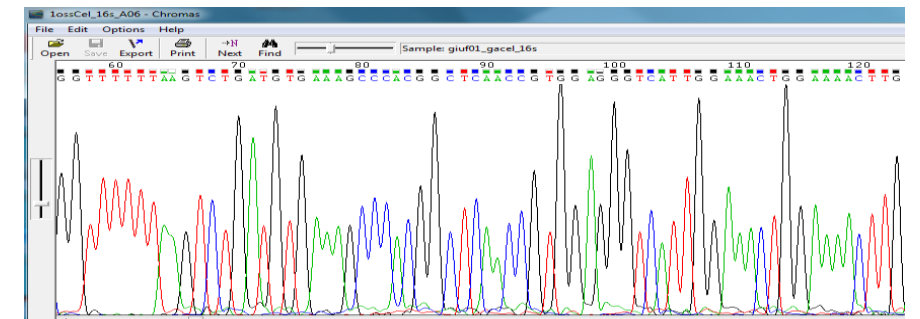
1. Estrazione del DNA dai batteri
2. PCR per identificazione di specie
3. PCR dei geni di resistenza



Elettroforesi di DNA su gel di agarosio



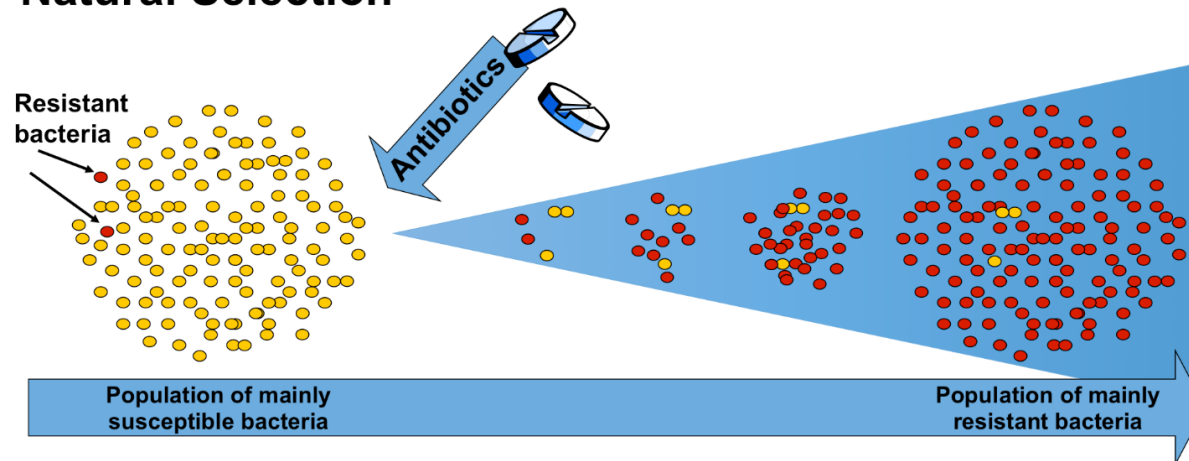
Elettroferogramma



ANTIBIOTICO RESISTENZA

- Gli antibiotici uccidono i batteri sensibili
- Mentre i batteri resistenti sopravvivono
- Possono moltiplicarsi e prendere il sopravvento

Natural Selection

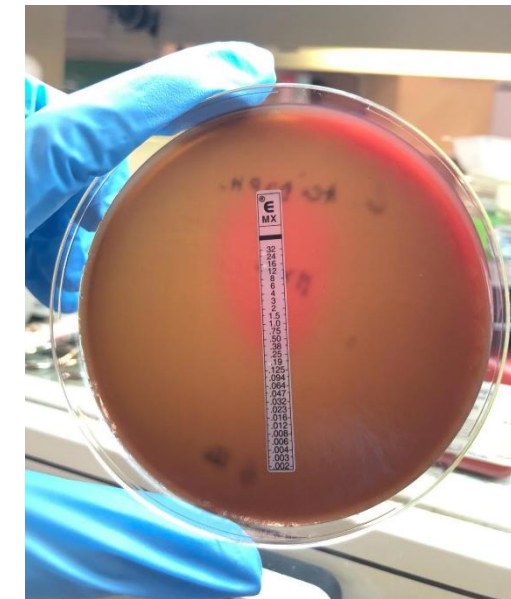
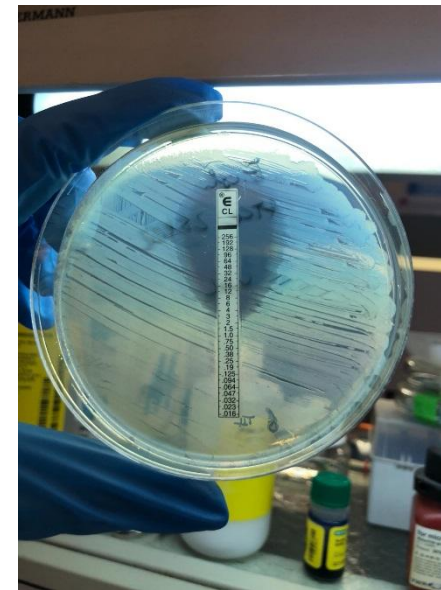


Meccanismo di selezione darwiniana

Come capire se un batterio è resistente ad un antibiotico?



Metodo E-test per la determinazione della MIC (minima concentrazione inibente) dei batteri



Il nostro percorso in ISS.....lo abbiamo vissuto così

