IDENTIFICATION OF THE ACTIVATORS OF RESISTANCE TOWARDS LAST-LINE ANTIBIOTIC VANCOMYCIN IN ENTEROCOCCI OF HOSPITAL-ACQUIRED INFECTIONS.

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Hospital-acquired infections (HAI) have been significant causes of concern throughout the history of the National Health Service. Most recently, the increasing numbers of HAIs by enterococcal agents were highlighted by Public Health England coupled with the emergence resistance towards last-line glycopeptide antibiotics vancomycin and teicoplanin. (Fig. 1). Of the two types of vancomycin resistance in enterococci, type A (vancomycin and teicoplanin resistant), rather than type B (vancomycin resistant, teicoplanin susceptible) is the most prominent in the UK and is the system that will described.

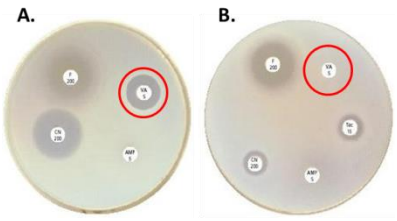

Figure 1: Agar plates of *E. faecalis*. (A) Vancomycin sensitive. (B) Vancomycin resistant

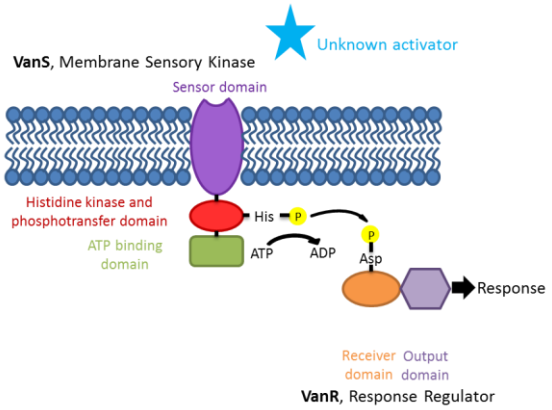

Figure 2: Schematic of the VanRS two-component system regulating vancomycin resistance in the enterococci.

All vancomycin resistances in Gram-positive bacteria, e.g. enterococci, staphylococci are controlled by a two-component response regulatory system (TCS). TCSs allow the organism to appropriately respond to external stimuli. TCSs are composed of a membrane-bound sensory protein and a partnered cytosolic regulator protein which upon activation initiate responses by the bacteria. Vancomycin resistance in the enterococci is regulated by the VanRS TCS composed of VanS (the sensor) and VanR (the partner regulator) (Fig. 2). The activating stimulus of VanS is still unknown. Clinically, understanding the initiating step for the onset of resistance gene expression is important for preventing the spread of resistance, and most importantly may pave the way for finding new ways to combat the challenge of resistant organisms. Here we discussed some of the results of on the potential role of "last line" antibiotics vancomycin and teicoplanin in the onset of type A vancomycin resistance in clinically-relevant enterococci.