

CHAPTER 3: CONCEPTUAL FRAMEWORK AND HYPOTHESIS

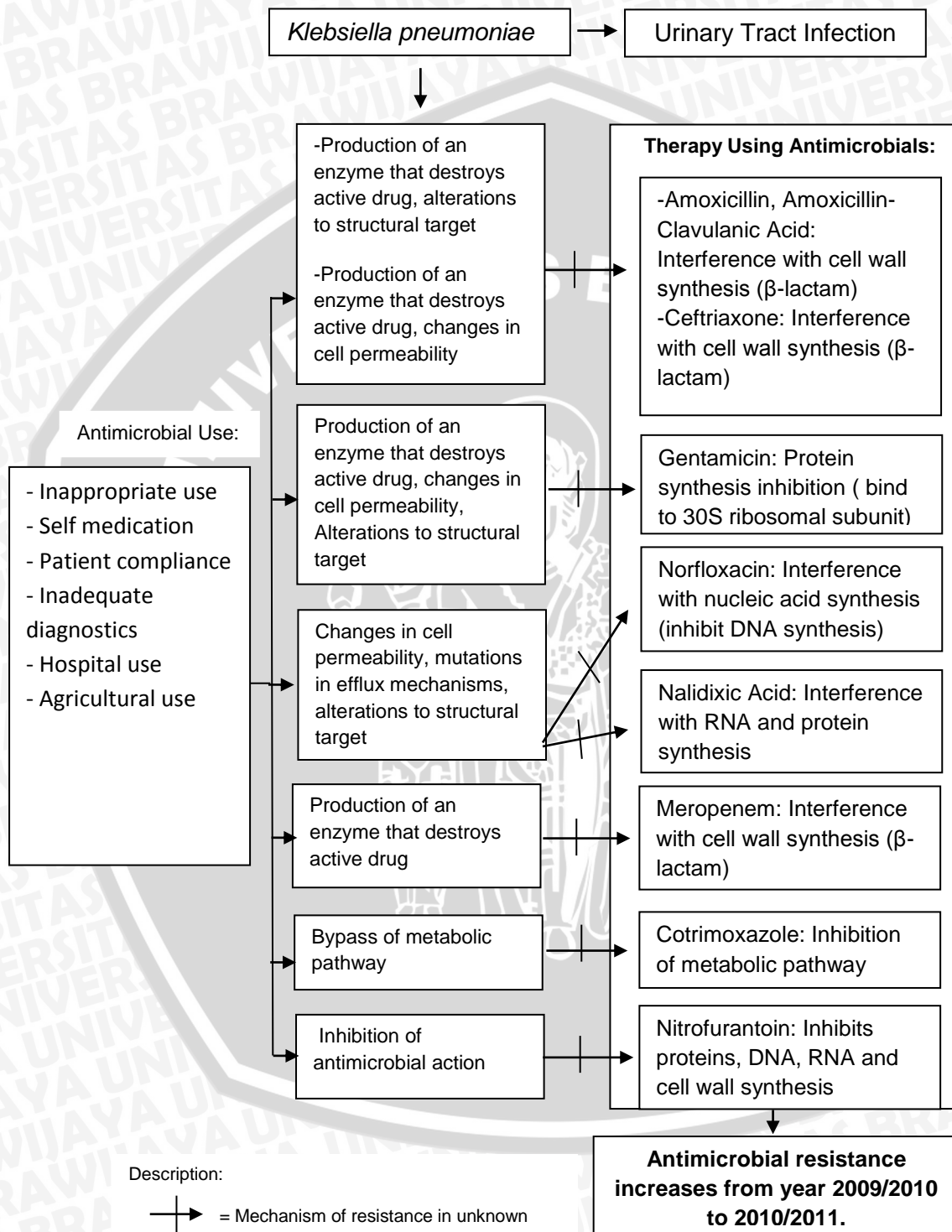


Figure 3.1 Conceptual Framework



Klebsiella pneumoniae is the second most common cause of urinary tract infections and is also an important cause of nosocomial infections. Antimicrobials used to treat urinary tract infection in present show an increasing trend of resistance. Resistance of *Klebsiella pneumoniae* towards antimicrobials may occur via few ways. Antibiotic modification can occur in 2 ways which are; enzyme modification where enzyme that degrades antibiotic such as β -lactamase and enzyme addition where the enzyme adds chemicals to antimicrobial drug, thus inhibiting its activity. Besides that, efflux mechanism also causes resistance where *Klebsiella pneumoniae* acquires an additional membrane protein which pumps out the antimicrobials. *Klebsiella pneumoniae* also develops a novel metabolic pathway that by bypassing the effect of the antimicrobial, thus rendering it ineffective. Altering the target site is another mechanism of resistance of *Klebsiella pneumoniae* where the target site undergoes mutation, rendering it to be less susceptible to antimicrobial inhibition. Changes in membrane permeability results in the decrease of antimicrobial entry thus causing resistance.

There are many factors that cause the antimicrobial resistance to occur. Taking consideration for nonbacterial infections (such as in common cold), ineffective doses or for an inadequate or inappropriate length of time, overprescribing of broad-spectrum antimicrobial, antimicrobial agents not only be ineffective, but exerts strong selective pressures upon bacterial population. These favor organisms that are capable resisting them. Besides, non-human application where antimicrobial is used as regular supplements for prophylaxis or growth promotion in crops and animals also causes resistance towards antimicrobial drugs.

3.2 Hypothesis

The hypothesis of this research is there is a change in the susceptibility pattern of *Klebsiella pneumoniae* towards antimicrobials from year 2009/2010 to year 2010/2011.

