CHAPTER I
INTRODUCTION

1.1.Background

In essence, the Natural Sciences is the science of natural phenomena, in the form of facts, concepts, principles and laws, the truth has been tested and achieved through the scientific method. According to Kara and Yesiyurt cited by Yusnawati (2011) the objective learning of the Natural Science is to help students develop an understanding of the concepts and know how to apply these concepts in life. Understanding the concept is very needed, especially in biology to integrate the nature and technology in our daily life. Understanding of the concept can help students to describe that concept and connect with the other concept then can explain the natural events around them (Winahyu, 2007). However, errors often occur where the concept received incompatible with the actual concept. The concepts that have peculiar interpretations and meanings in students' articulations that are not scientifically accurate called as misconceptions. According Suparno (1997) misconception is the concept that incompatible with the concept that recognized by the experts. In the literature (Tekkaya, 2002), misconceptions are also referred as alternative conceptions (Arnaudin & Mintzes, 1985), preconceptions (Ga1legos, Jerezano, & Flores, 1994), alternative frameworks (Driver, 1981), erroneous ideas (Sanders, 1993), and children science (Gilbert, Osbome & Fenshman, 1982).

In science education, students come to the formal learning environment with various misconceptions. Daily used phrases, intuitional learning, misconceptions in textbooks, and teachers explanations could cause misconceptions in students minds (Tekkaya, 2002).Therefore, misconceptions can occurs at the inside and outside of the school environment. Teachers and books can be as the source of misconceptions in the school environment..According to Hiller in Hewindati and Suryanto (2004), there is a close relationship between quality of explanations and knowledge of teachers with student learning achievement. Teacher who lack knowledge causes presentation of the subject matter is not clear which will lead to the misconceptions. Duit (2007)

report his research that since 1980s the role of teachers conception in teaching and learning science has been investigated. In the result of his research, show that there are many teachers who have science concepts and teaching process which do not fit with the scientific concept and often similar with students pre-instructional conceptions. Not only the teachers, textbooks and student's daily experience also can causes misconceptions (Suparno, 2005).

Misconceptions are believed to negatively effect for students conceptual development. Bodner (1986) indicated that misconceptions would be an obstacle to constructing new knowledge regardless of the quality of teaching. These existing ideas are often strongly held, resist to traditional teaching and form coherent though mistaken conceptual structures (Driver and Easley, 1978). It won't be easy to change or to remove the misconceptions (Sahin, 2008).Osborne, Bell and Gilbert in Tüysüz (2009) stated that students often misinterpret, modify or reject scientific viewpoints on the basis of the way they really think about how and why things behave, so it is not surprising that the research showed that students may persist almost totally with their existing views.

According to Driver et al. (1994), among many other misconceptions, a number of biology misconceptions held by secondary students. Students bring their preconceptions to class in science education. Students develop ideas and beliefs about the natural world through their everyday life experiences. These include informal instruction like, sensual experiences, language experiences, cultural background, peer groups, as well as formal instruction. Studies have revealed that during science class students bring about certain ideas and explanations to natural phenomena that are inconsistent with the ideas accepted by the scientific community (Osborne et al., 1983). Students maybe do well in a test but not change their original ideas even these ideas are in conflict with the scientific concepts they were taught. Duit and Treagust (1995) attributed this to students being satisfied with their own conceptions and therefore seeing little value in the new concepts.

A major theme of science education research throughout the past three decades has been students' misconceptions of scientific phenomenon. In July,

1987, an international seminar on misconceptions in science and mathematics was held at Cornell University. Based on result of the International Seminar on Misconceptions in Science and Mathematics (Novak, 1987) found that misconceptions about science concepts experienced by students in various country from the students in elementary school till the college student in University. Misconceptions itself can occur in every field of sciences, such as astronomy, chemistry, physics, and biology (Yusnawati, 2011).Especially in biology, research about misconceptions has been done. Some of the subject matter that ever discuss in research such as cell, photosynthesis, respiration in plants, respiration in human, vertebrate and invertebrate, diffusion and osmosis, excretion, nervous system, evolution, animal classification, circulatory system, genetic, and ecology (Panggabean, 2011).

Misconceptions that occur in one topic or matter in biology can be an obstacle to understanding the other biology topic. Many concepts in biology are interrelated and they are keys to understanding the other concepts, so that misconceptions on one concept lead to misconceptions on the other concept. For example, without understanding of photosynthesis, the concepts of food chain and food web are meaningless to students. However, before photosynthesis, students must understand the distinction between producers and consumers, as well as organic and inorganic molecules (Tekkaya, 2002). The other example, concept of excretion system and respiratory system would be difficult to understand if we don't understand the concept of the circulatory system. Mostly misconception occur caused by biological concepts that are abstract. Dikmenli (2010) stated that students have difficulty in understanding the concept of cell division, mainly associated with meiosis rather than mitosis caused concept that are abstract, causes student confuse about stage of cell division and what happened in this stage.

The concept of excretion is fundamental to the secondary biology curriculum and is usually introduced to students at a very early stage of the course when teaching about the characteristics of living organisms while the mechanisms of excretion are elaborated at a later stage (Chan, Chu, & Kong, 1994; Pang, 1993

in Din-Yan 1998). According Din-Yan (1998) students in Hong Kong show misconception in the concept of excretion. In his research, showed that most students did not view exhalation as an excretory process. One possible reason is that many students were not able to relate the removal of carbon dioxide during exhalation to an excretory role, as exhalation was learned in the context of ventilation and not linked with excretion. These students wrongly considered the undigested waste as an excretory product. The idea of metabolic waste is a difficult and abstract concept for the average student and is not well understood even after formal instruction. A smaller but significant proportion of the students considered wrongly that the release of saliva was an excretory process. This indicates that some students tend to consider that secretions made by the body usually contains some unwanted materials, which does not hold true for saliva. This reflects some confusion about the nature and roles of secretion and excretion in biological processes. It is interesting to note that this conceptual problem was shown by students of all ranks to a similar extent, which means that even some of the high ability students had difficulties in distinguishing the two processes. From the observation with biology teachers in SMA Negeri at District Medan Kota, indicates the biological misconceptions in students. The teachers say that students grade XI are often not clear in outlining the concept and give examples. Also from observation, students show misconception about human excretory system. Students do wrong in apply the meaning of excretion, in other words, student do wrong in distinguish which can classified into the excretion process. For example, students view CO_2 just as the result of respiration, not related with the excretion process. Another example, students doesn't look the liver related to the excretory system, more to the digestive system. Students look the bile just as secretion process, not excretion process.

Based on the background that has been submitted, we can get illustration where the misconceptions have a negative effect on learning outcomes. Therefore, misconceptions must be corrected. Before misconceptions can be corrected, we need to identify the misconceptions. As the first step, researcher want to identify whether misconception on the topic of excretory system also happens to the

students of SMA Negeri in Medan academic year 2015/2016.In an effort to identify the presence of misconceptions on the topic of excretory system at the students of SMA Negeri in Medan, researcher want to conduct research about Analysis of Students' Misconception on The Topic of Human Excretory System in Grade XI SMA Negeri District Medan Kota.

1.2.Problem Identification

Based on the background described above, problems can be identified as follows :

1. There are misconceptions in understanding the concept of human excretory system.
2. Misconceptions occur in understanding definition, relation and application of concept.
3. Resource of misconception can come from personal experience, language, visual representation, teaching methods, and lag of information causes old concept doesn't renewed.
4. Misconceptions give harmful effects due to give understanding that less accurate even an error occurs between the right and wrong concepts.
5. Misconceptions may occur as a result of the biological concepts are abstract and difficult to understand.

1.3. Scopes of Research

Based on the problem identification and in order to keep this research more focused and directed, research limited as follows:

1. Identification misconception on the topic of human excretory system in students of grade XI SMA Negeri at District Medan Kota academic year 2015/2016.
2. Identification which concept in human excretory system that become misconception for students grade XI in SMA Negeri at District Medan Kota academic year 2015/2016.

3. Identification percentage of the concept on the topic of human excretory system that become misconception for students of grade XI SMA Negeri at District Medan Kota academic year 2015/2016.
4. Identification source and cause of misconception on the topic of human excretory system for students of grade XI SMA Negeri at District Medan Kota academic year 2015/2016

1.4. Problem Formulation

Based on the background described, problems can be formulated as follows :

1. Is there misconception on the topic of human excretory system in students of grade XI SMA Negeri at District Medan Kota academic year 2015/2016?
2. Which concept on the topic human excretory system that become misconception for students grade XI in SMA Negeri at District Medan Kota academic year 2015/2016?
3. How many percentage of the concept on the topic human excretory system that become misconception for students of grade XI SMA Negeri at District Medan Kota academic year 2015/2016?
4. What the source and cause of misconception on the topic of human excretory system for students of grade XI SMA Negeri at District Medan Kota academic year 2015/2016?

1.5. Research Objective

The objective of this research are :

1. To identify whether there is misconception on the topic of human excretory system in students of grade XI SMA Negeri at District Medan Kota academic year 2015/2016
2. To identify which concept on the topic human excretory system that become misconception for students of grade XI SMA Negeri at District Medan Kota academic year 2015/2016

3. To identify percentage of the concept on the topic human excretory system that become misconception for students of grade XI SMA Negeri at District Medan Kota academic year 2015/2016.
4. To identify source and cause of misconception on the topic of human excretory system for students of grade XI SMA Negeri at District Medan Kota academic year 2015/2016

1.6. Research Significance

The results of this research will provide benefits, namely:

1. Theoretically, the result of this research expected to be able to add information in education about misconception problem in biology learning then can use to change misconception in students of Senior High School. Furthermore, the result of this research hopefully can be used as reference for the further research that discuss same discussion with this research.
2. Practically, the result of this research hopefully can add insight and knowledge for the teachers, educational institutions, and other researcher who wants to know the problems of learning in biology associated with misconceptions.