The detailed life cycle of *Ascaris suum*.

This parasite starts its life cycle as a tiny embryo inside a very resistant parasite egg with a sticky outer coat. The egg is extremely tiny (60 µm x 40 µm) and therefore invisible to the naked eye (Fig. 1A). These eggs are produced by the adult worms that live inside the small intestine and are shed into the environment in the faeces of the infected pig. When temperature and humidity levels are favourable, it takes a minimum of about 5 weeks for this embryo to develop into an infective stage larva, also called the L3-stage larva (Fig. 1B). Now that the egg contains an L3, it is able to induce a new infection after being ingested by a new host. Depending on the conditions, these eggs have shown to remain infective for multiple years.

Infecitive eggs that are present in the environment get ingested by foraging pigs and end up in the small intestine (Fig. 1C). There, the L3’s within the eggs start secreting substances that degrade the hard eggshell. Soon after, the larvae are freed into the lumen of the intestine and can start their migration through the body of their host. First they penetrate the intestinal wall at the level of the caecum or colon and migrate towards the liver (Fig. 1D) using the blood vessels that transport the blood from the intestine towards the liver. At about 3 days post infection (p.i.) most larvae have reached the liver and are now migrating through the liver tissue searching for the blood vessels that will guide them to the lungs (Fig. 1E). The tiny larvae (±1mm) get stuck in the capillary blood vessels of the lungs, migrate into the alveoli and subsequently crawl up the respiratory tree. One week p.i., most of the larvae have reached the lungs. The larvae are eventually coughed up and swallowed by the pig, ending up in the small intestine again where they moult into the next stage of development, namely the L4 stage.

At this moment, between 17 and 21 days p.i., an important process takes place in the pig. A naturally induced immunological process expels the majority (>90%) of the larvae that have reached the small intestine. Some pigs even seem to be capable of flushing out all worms from their gut. As a result, most of the infected pigs will harbour only few or possibly even no adult worms at all. How or why this happens is still quite unclear at the moment. However, research has indicated that several genetic factors might come into play here. Only a small number of infected pigs will eventually retain a high number of adults in its intestines.

When both male and female worms are present in one host, reproduction can occur and the shedding of new eggs can be detected from approximately 42 days or 6 weeks p.i. If the adult worms are not killed by anthelmintic treatment, they can remain present for over 1 year within the guts of their host and grow out to reach over 40 cm of length (Fig 2). Large female worms are highly fecund and easily produce over 200,000 parasite eggs per day that end up in the environment again, hereby completing the life cycle.

Figure 1: Representation of the life cycle of *Ascaris suum*. 