HEARTWORM FACTS

Worms in a dog's heart. Here is a factoid sheet...

The short version:

Microfilaria are the larval stages L1, L2, L3, and L4. Adults are the actual worms.

The long version:

There are male and female heartworms. They mate in the arteries of the host (your dog in this case). Picture that! Ok, don't.... The female heartworm gives birth to LIVE (yes live! - what's called viviparous - live birth) teeny prelarval heartworms called microfilaria. Microfilaria are in the blood of the host (your dog). A mosquito comes along and takes a blood meal from your dog and sucks up a microfilaria - this is why they have to be so small! (Note: the microfilaria CANNOT become mature adult heartworms in the host (your dog). They have to complete part of their development in the alternate host - the mosquito. This may seem unnecessary and chancy, but it really is a great evolutionary survival strategy. If the heartworm completed its entire life cycle in the dog, its really a dead end - they've killed themselves off when the host dies! Thus by moving part of the life cycle to another species - a flying mobile one at that, there's a better chance of surviving as a species by infecting new hosts and occupying a greater geographical area. Pretty neat huh! Well, it's not really fun for the dog, but one has to admire the inventiveness of nature!)

The microfilaria migrates to a special place in the mosquito (Malphigian tubules) and grows into an L1, molts to an L2 and molts again to an L3. The L just means larval stage. If you are not familiar with molting, the critter molts or sheds its skin so it can grow into a larger size without breaking the skin. Most caterpillars do this - when they hatch from an egg they're tiny and as they keep growing they have to keep molting or they'll bust open! An L3 is the infective stage of larva.

It's now ready to move back to your dog. The L3 migrates to the mouthparts of the mosquito. When the mosquito next takes a blood meal, the larva crawls out and enters the bite wound in your dog. Most nematodes don't have chewing mouthparts so there would be no other way for the larva to get into the dog otherwise - unless it was through the anus or mouth. It does not go to the blood stream but stays under the skin (subcutis).

Within 2-15 days the L3 molts again into an L4 and travels around under the skin for 60-90 days. (This makes one wonder how close to the skin surface it actually is and if the host has a great immune system, if they can wall it off and get rid of it with a skin irritation.....hmmmmm) After 90 days or so the L4 molts into an adult and migrates to the heart. If there are both male and female heartworms present they mate and once again there are microfilaria in the blood. It is possible to get single sex infections - all male or sterile females who haven't had a chance to mate if there are no males present. In single sex infections there will be no microfilaria.

SO, if you have microfilaria in the blood you know you have mature reproducing female heartworms in the dog, as there is no other way for them to get there. Microfilaria can be detected with the Knotts blood test. Female adults can be detected with the ELISA - occult adult - antibody test.

There are two parts to beating heartworm no matter what protocol you use: killing the adults and killing off the L3-L4 and microfilaria. With standard adult heartworm treatment, Immiticide for example, you kill the adults in a short span of time - a few weeks, do an ELISA test to make sure all the adults are dead, then give the dog either Ivermectin or Milbemycin to kill off the other stages of heartworm left in your dog. Because the standard treatment occurs in such a short time, there is less chance for the L3 or L4 larvae in the body to mature into adults after the adults were killed off. (Of course we are assuming here that there actually are L3-L4 in the body - there is no way to test for this, but if the area you live in is a known heartworm area and your dog actually has adult worms, this is probably an accurate assumption.)

It would be conceivable that sometimes a treatment might have to be repeated if the timing was very wrong, but this is probably rare. Treatment is over at that point and then you either have to use Ivermectin or Milbemycin as a heartworm preventative to keep your dog from being reinfected with L3 heartworms by mosquitos. Note: Diethylcarbamazine (Filarabits) cannot be given to dogs with microfilaria and should NOT be used for this second part of the treatment, as there is a potential for a shock reaction.

When using an alternative adulticide treatment, you MUST do something to kill off the L3-L4 in the dog otherwise they will develop into more adult heartworms while the dog is in treatment. Also the females still present in the dog can produce more microfilaria, thus serving as a reservoir of infection for your dog, other pets you have and your neighbor's pets.