

# Quarterly review of diagnostic cases – January to March 2006

## New Zealand Veterinary Pathology

### Cattle

Climatic conditions seem to have favoured **lungworm** this year, as several cases of respiratory disease in cattle have demonstrated. In one case from the Rotorua region, yearling heifers were coughing when moved and failing to gain weight. IBR antibody ELISA on one animal was negative. Two animals tested were hyperfibrinogaemic indicating inflammation. Faeces from one animal had 30 *Dictyocaulus viviparus* larvae per gram of faeces, suggesting a moderate to heavy lungworm burden.

Over the late summer and autumn months, a number of groups of calves from the Waikato, Wairarapa and Manawatu had illthrift and/or scouring. In a typical case involving 50 calves, results of faecal egg counts and tests for bovine viral diarrhoea virus and copper deficiency were unrewarding. However, measurement of serum selenium concentrations allowed diagnosis of **selenium deficiency**. Herd mean was 94 nmol/l (reference range 150-3500). Low selenium is frequently diagnosed as a cause of illthrift and scouring in six- to eight-month-old calves.

In general over the late summer and autumn months there was not much clinical **facial eczema** in dairy cattle in the upper North Island. However, throughout the Manawatu, Waikato and North Island central plateau there were sporadic cases of some severity. Affected cattle typically presented as irritable and shade-seeking with occasional manifestations of photosensitive dermatitis and jaundice. Gamma-glutamyltransferase concentrations have typically been greater than 1000 IU (reference range 0-36 IU) with some exceeding 3000 IU.

Ongoing deaths occurred in a group of calves that had been hard grazed on wheat stubble paddocks with significant amounts of inkweed and lupin present. The main finding in all the calves was a nephrosis but some were also jaundiced. Saponin toxicity from **inkweed poisoning** is considered the most likely cause of the deaths.

In late January, two cows in the Horowhenua district presented with severe photosensitivity, subsequently attributed to **turnip photosensitisation**. The herd had been grazing turnips. Liver damage from the glucosinolates in the turnips was considered the most likely cause of the hepatopathy, which was evident in the blood as marked increases in both GGT and GDH.

A weaner calf on a property in the Auckland area exhibited fever and coughing, and died the next day. Necropsy and histology revealed a suppurative interstitial pneumonia with numerous syncytial cells visible within alveoli. The histopathology was considered to be consistent with **bovine respiratory syncytial virus** (BRSV) infection, possibly complicated with bacterial pneumonia. BRSV is a sporadic cause of respiratory disease in younger animals

Each quarter, Surveillance publishes a review of selected diagnostic cases handled by New Zealand's diagnostic laboratories. These cases do not necessarily reflect the national disease profile but they do represent diseases of interest to the livestock industries or of significance to wildlife or companion animals.

in New Zealand.

Serum from a group of 84 six-month-old calves in the Waikato district was tested using the **bovine virus diarrhoea** (BVD) antigen ELISA. Twenty-two calves (26%) were positive, suggesting they were viraemic at the time of sampling. Re-sampling and testing two weeks later revealed they were still positive on the antigen ELISA, indicating persistent infection. Properties with large numbers of persistently infected young stock are periodically noted. This happens most frequently when BVD virus is introduced into a group of naïve heifers or cows that are at less than 125 days gestation. Alternatively, if a high percentage of mature stock survive as persistently infected they may give birth to persistently infected offspring.

### Sheep

A property in the Rangitikei had sudden increase in mortality in six-month-old lambs, with five dying over ten days. Clinical signs included fever and some bloating. Necropsy of a freshly killed lamb showed a marked mucopurulent meningitis. Histological examination confirmed the gross findings and was consistent with ***Histophilus somni*** infection, although cultures were not performed.

There was a moderate incidence of ***Salmonella* Hindmarsh** infection in the Central North Island this quarter, with ten of 23 (43%) ovine submissions cultured for *Salmonella* being positive for *Salmonella* Hindmarsh. In a typical case, three of a group of recently drenched two-tooth ewes were recumbent and one dead. Postmortem of the dead ewe revealed watery diarrhoea and fluid abomasal content. Histology was consistent with salmonellosis, and culture of the ingesta confirmed the diagnosis.

### Goats

A property in the Waikato experienced increased mortality in young kids of one to six months of age. One hundred of 500 animals were treated with antibiotics, and 14 died. Histological examination of lung from one kid revealed an acute fibrinous bronchopneumonia, and ***Mannheimia haemolytica*** was isolated.

### Pigs

A litter of two-day-old piglets in the Taupo region had increased mortality with vomiting and yellowish diarrhoea. Histological examination of a euthanased sick piglet revealed numerous bacilli adherent to the brush border of enterocytes in the small intestine, consistent with **enterotoxigenic *E coli*** infection.

## Horses

A horse from the Auckland region presented with bilateral mucopurulent nasal discharge. Culture of a nasal swab revealed heavy growths of *Streptococcus equi* subsp *equi* and *Streptococcus equi* subsp *zooepidemicus*. Equine **strangles** was diagnosed. The patient was treated and clinical signs resolved. A sample taken two weeks after initial diagnosis was negative for *Streptococcus equi* subsp *equi* but another swab taken one month after initial diagnosis revealed that *Streptococcus equi* subsp *equi* remained, even though clinical signs had resolved. The horse was lost to further follow up.

A large 10 kg tumour attached to the dorsal abdominal wall of a 14-year-old gelding was removed surgically. Histology revealed it was composed of neoplastic epithelial cells arranged in a papilliform pattern and rows along a fine fibrovascular matrix, resembling reproductive tissue. **Carcinoma** of the rete testis or epididymis was suspected.

A two-year-old filly from Horowhenua was excessively nervous when starting training. Serum magnesium levels were normal but blood lolitrem levels (0.6 ng/ml) indicated ingestion of **lolitrem** in feed. Lolitrem B is the toxin involved in ryegrass staggers, and may have contributed to the clinical signs in this case.

## Dogs

A two-year-old Bearded Collie presented with bloody diarrhoea, depression and a temperature of 40.1°C. She had been stung by bees two days before and had multiple swollen areas on the face and inside her ears. There was evidence of intravascular haemolysis with haemoglobinaemia and haemoglobinuria. The haematocrit was 0.33 (reference range 0.37-0.55) with evidence of a good regenerative response. Two days later the haematocrit had dropped to 0.17 but there was no evidence of further intravascular haemolysis. **Haemolytic anaemia from bee venom** was diagnosed. Bee venom contains haemolysins and the multiple stings were considered the cause of the initial haemolytic episode. An immune-mediated response is also believed to occur and probably accounted for the further drop in the haematocrit.

CNS signs are uncommon presenting signs of canine hypothyroidism. A tentative diagnosis of **hypothyroidism** was made in a six-year-old female Irish Setter that presented with ataxia and lethargy. Cholesterol was increased and total T4 levels were very low. No other abnormalities were found and there was a significant response to treatment with thyroxine.

An 11-year-old Labrador presented with a chronic harsh productive cough. Chronic bronchitis was diagnosed on x-ray and bronchoscopy. Examination of bronchoalveolar lavage fluid revealed a granulomatous inflammation with septate fungal hyphae amongst the inflammatory cells. *Aspergillus* was cultured from the fluid.

## Cats

*Mycoplasma haemofelis* (formerly *Haemobartonella felis*) was found in two young cats from one household. The first cat

presented with severe dyspnoea. There was a mild anaemia and mild leukocytosis. Low numbers of *Mycoplasma haemofelis* were found on the blood smear and low numbers of keratocytes were present. The unusual presenting signs of the dyspnoea and later development of subcutaneous oedema prompted consideration of a vasculitis secondary to either the haemoparasite infection or immune-mediated reaction to the parasite. The cat was FIV negative. The second cat also had a parasitaemia but no anaemia and no evidence of a vasculitis.

A six-month-old Oriental kitten presented shivering and shaking. Both total and ionised calcium levels were markedly decreased and phosphate levels elevated. A diagnosis of primary **hypoparathyroidism** was made after ruling out other causes.

## Birds

A one-year-old female **canary** was submitted for postmortem. The canary had had a clutch two months earlier and one chick had died suddenly two days before. The adult female exhibited feather loss over the head and wings. Numerous adult and nymph forms of **bloodsucking mites** were found in the feather coat. The mites were most likely of the family Dermanyssidae, which includes *Dermanyssus* spp and *Ornithonyssus* spp. Heavy infestations of both these species of bloodsucking mites can cause severe anaemia and death.

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## Gribbles Veterinary Pathology Cattle

Two cases of **acorn toxicity** were seen in cattle from the Rodney area north of Auckland. The first involved a group of cattle under severe feed and possibly also water stress. The animals had access to acorns but few were found on the ground and none in the gastrointestinal tract of the animal necropsied. Three animals died. Perirenal haemorrhage and renal petechiation were seen postmortem, along with a fluid-filled abdominal cavity. Histologically there was a severe nephrosis with degeneration and necrosis of renal tubular epithelium and tubular casts. Fat reserves were depleted. The second case, from the adjoining practice, involved calves and sheep on a lifestyle block. Three cattle and two sheep had died after a bloody diarrhoea but none were presented for necropsy. Blood samples from two remaining calves showed a severe azotaemia. Salmonellosis and parasitism were ruled out. The calves had had access to acorns two weeks before death. The clinical history and marked azotaemia were consistent with acorn toxicity.

**Acorn toxicity** was also diagnosed in a group of 30 six-month-old Friesian heifers in the Wairarapa. After grazing for four days in a paddock with plenty of grass but also oak trees, they were moved and two days later some showed signs of illness and one died. Over the next couple of days four more died. The cattle

had anorexia, were not drinking, and were dull and depressed. Necropsy of one showed a large amount of peritoneal fluid, which cytologically was found to be a pure transudate with very few cells and very low protein. Serum biochemistry in four animals revealed marked increases in serum creatinine concentrations of 288, 884, 855 and 1090  $\mu\text{mol/l}$ , serum urea concentrations of 34.4, 82.8, 96.2, and 104.7  $\text{mmol/l}$ , respectively. The animals were also hyperphosphataemic, hypermagnesaemic and one was hypocalcaemic. Histological examination revealed a nephrosis consistent with acorn toxicity.

A number of cows died on a farm in the Kaipara area after being removed from a paddock of maize stubble and amaranthus. The animal necropsied showed perirenal haemorrhage and focal ulceration of the distal oesophagus. Histology revealed a tubular nephrosis with small numbers of oxalate crystals and was consistent with death from **amaranthus toxicity**. The oesophageal ulceration was related to infarction and was considered an incidental finding related to partial obstruction from ingestion of a maize cob.

Five days after a mob of Rangitikei dairy cows began grazing a crop of turnips three cows had photosensitivity; one had severe ventral oedema, the second hind limb swelling and the third was also aggressively ataxic. Sporidemin spore counts were negative. Serum samples from the three cows showed glutamate dehydrogenase concentrations of 879, 611 and 961 IU/l (normal 8-41) indicating hepatocellular damage. Gamma glutamyl transferase concentrations measured 1154, 654, 454 IU/l (normal 9-39) confirming biliary damage as well. Turnip crops under stress such as drought produce glucosinolates. When cells containing these compounds are broken open by rumination they react with enzymes in the rumen. The connection between the glucose molecule and the sinolates is cleaved resulting in a toxic compound. The glucosinolate family is complex and the exact mechanisms and pathogenesis of the toxicity is currently unknown. Other cases of **turnip photosensitisation** were recorded in the Manawatu at a similar time in late January when both adjacent provinces were recording an unusually dry period.

Several outbreaks of **turnip photosensitisation** were seen in dairy cattle grazing turnips in the Ruawai area. The animals showed elevated serum GGT and bilirubin concentrations. The outbreaks coincided with rain after a lengthy dry spell in the area, which had resulted in a rapid growth of the crop. There was no evidence that nitrate toxicity was involved.

A biopsy from a cow in the Waikato confirmed the diagnosis of **papillomatous interdigital dermatitis**. Histologically the epidermis had marked parakeratosis and irregular hyperplasia. In some areas there were filamentous bacteria in the parakeratotic layers. There appeared to be two populations of silver stained bacteria present: occasional long filamentous ones and broader slightly beaded rods. The filamentous ones were similar to but not as numerous as those recorded in papillomatous interdigital dermatitis.

Several cases of **polioencephalomalacia** in calves were seen in Canterbury in January and February. Cases were either single or multiple, with ten or more calves affected in some cases. While nervous signs were the most common presentation, in several cases calves were found dead.

**Perivascular oedema** in the brain is a diagnostic feature of enterotoxaemia in lambs. Over the last 12 months, three more cases of perivascular oedema and white matter oedema of the corona radiata have been seen in cattle. One was in an 18-month-old Friesian animal from South Canterbury and the other two were adult Friesian dairy cows on Canterbury farms. The cause in cattle is unknown but enterotoxaemia or some other toxin inducing vascular injury are possible causes.

A well grown seven-month-old Friesian show heifer on a Southland dairy farm was found in sternal recumbency. A veterinarian found the heifer was dehydrated, with a slightly distended abdomen and a subnormal temperature. The animal was euthanased and a necropsy showed minimal changes apart from a small amount of fluid in the abdomen, and the distal intestine and colon filled with a moderate amount of fluid resembling bile. Histological examination revealed an acute necrotising enteritis and suppurative lymphadenitis with variable numbers of large adenovirus intranuclear inclusions in the endothelial cells of the intestine, rumen, colon, kidney and mesenteric nodes. **Bovine adenovirus** infections are sporadic and a relatively rare cause of death in young cattle in this country. No more deaths occurred on this farm.

A Manawatu mob of five-month-old Friesian cattle was in poor health; many had diarrhoea and one was recumbent. **Yersinia pseudotuberculosis** was cultured from two of three faecal samples.

A Wairarapa mob of 60 five-month-old Friesian bulls were not growing as well as expected and some had bloody diarrhoea. Ten animals were clinically ill and three had died. Faeces from three affected animals had moderate to heavy infestations with coccidia allowing a diagnosis of **coccidiosis**. Enteric culture was negative for pathogens.

A five-month-old Jersey heifer from Wanganui had severe extensive ulceration of the hard palate, tip of the tongue and around the incisors. A malignant catarrhal fever ELISA was positive and BVD antigen ELISA negative, suggesting a diagnosis of **malignant catarrhal fever**.

Diarrhoea in a dairy cow from Hawke's Bay was investigated and **Salmonella Ruiru** was isolated from faeces.

Six-month-old Wairarapa calves were not as healthy as expected. Selenium concentrations in six sera collected were 67, 40, 120, 120, 120, 140  $\text{nmol/l}$  (normal range 140-1000), confirming **selenium deficiency**.

A mob of two-year-old mixed breed Rangitikei beef steers that were growing poorly had serum copper concentrations of 0.5, 1, 2 and

2.6 µmol/l. Normal concentrations are 8.0-18.8 µmol/l, confirming **copper deficiency** as the cause of illthrift.

A group of cattle in the Manawatu was grazing a rough paddock that may have contained rubbish such as old batteries. The animals showed nervous signs, two went blind and one was found dead. Blood lead concentration from the surviving blind animal was 0.73 mg/l, confirming **lead poisoning**.

## Deer

A Southland deer farm trucked in 1,000 weaner deer from another farm an hour's drive away and yarded them briefly for pour-on drenching and vaccination. Within a week 40 were dead and others sick and recumbent. A necropsy of several showed worn hooves and pus draining from above the hooves or the fetlock or hock joints. All had extensive **lung abscesses** with pleural adhesions. On another deer farm in Western Southland about the same time a similar outbreak occurred, again in brought-in weaner deer. On this farm 180 died of 4000 transported. Similar lesions were seen on necropsy.

A four-month-old weaner stag on an Otago deer farm was noticed to be partially blind but it was otherwise in good condition. The farmer eventually shot it and removed the brain. Histological examination revealed an extensive **fungal meningitis**, the cause of which was not determined.

A six-week-old fawn on a small Central Otago deer farm was down with diarrhoea. As five other fawns had died over the past week with the same signs a necropsy was carried out. This showed extensive haemorrhage and necrosis of large areas of the wall of the colon, large amount of fibrin in the pericardial sac and pale streaks over the surface of the heart. Histological examination revealed a severe nutritional cardiomyopathy consistent with **selenium deficiency**, confirmed by a low liver selenium concentration (290 nmol/kg).

## Sheep

Twelve ewes from a mob of 2000 died suddenly on a Gisborne farm. **Salmonella Hindmarsh** was cultured from lymph node and a faecal sample. This is a typical history and loss rate for sheep at this time of year involving *Salmonella* Hindmarsh.

Lambs on a Rangitikei property had been grazing a Pasja (brassica) crop in late summer. Twenty-four hours after mustering and yarding for routine husbandry procedures, 11 lambs were found recumbent in the yards. Serum creatinine phosphokinase (CPK) levels were elevated; the highest concentrations were 52,340 IU/l (normal 132-1573). Muscle samples histologically revealed acute coagulative necrosis with only minimal scattered mineralisation. Blood selenium concentrations were normal, but vitamin E concentrations ranged from 1-5 µmol/l (normal >5) suggesting a vitamin E associated **nutritional myopathy**. It is believed high polyunsaturated fatty acids ingested in the crop, low serum vitamin E concentrations and mustering contribute to rhabdomyolysis.

Cases of illthrift were investigated in sheep on a Wairarapa

farm. Necropsy of an aged ewe showed marked thickening of the small intestine with spread to the mesentery. An intestinal **adenocarcinoma** was confirmed by histology.

## Goats

A recently weaned goat was brought indoors in the Wellington region. It developed severe diarrhoea and died. A faecal egg count was 700 epg. *Yersinia enterocolitica* was cultured from a faecal sample and this was the most likely cause of enteritis and death.

## Alpacas

A two year-old male alpaca had extensive scabby lesions resembling mud fever in the horse, and involving the lower limbs. A digest of scrapings of the lesion showed a number of mites resembling *Chorioptes bovis* – the likely cause of this extensive lesion. Other alpacas on the small farmlet in Otago were not affected.

An 18-month-old castrated male alpaca from Horowhenua was found recumbent one morning and while the veterinarian was examining the animal, it died. At necropsy the liver appeared shrunken and fibrosed. Histology revealed no normal remaining liver, which was replaced by fibrosis and hyperplastic bile ducts consistent with previous toxic liver damage – most likely from **sporidesmin toxicity**. There was also marked spongiosis between the grey and white matter of the brain consistent with hepatic encephalopathy.

## Horses

An Arabian foal suspected of having severe combined immunodeficiency had persistent, poorly responsive pyrexia, pneumonia and conjunctivitis. It had severe lymphopenia. *Streptococcus equi* had been isolated. Histology of the spleen revealed no lymphoid follicles or periarteriolar lymphoid cuffs. The red pulp contained macrophages and low numbers of polymorphs. The lymph nodes had the stromal framework but no lymphoid follicles or lymphoid cells. The sinusoids were dilated and contained scattered macrophages. Some nodes had numerous macrophages and polymorphs in the sinusoids. No thymus was detected in the tissue taken from the thymic area. A diagnosis of severe combined **immunodeficiency** of Arabian foals was confirmed by a DNA test in the USA. A previous case was reported in *Surveillance* volume 1, p 13, 1978.

A four-month-old Standardbred foal was found dead on a Southland stud farm. A necropsy showed a severe haemorrhagic enteritis and a large amount of fibrin in the abdominal cavity. There was also a large amount of foam in the airways of the lung. There were no significant isolates on culture of the lung and intestinal contents but histological examination of the intestine revealed large numbers of nematodes resembling *Strongyloides westerii* both in the lumen and embedded in the mucosa.

A four-month-old Thoroughbred foal died suddenly after a prolonged inflammatory illness for which the source could not be determined. At necropsy, vegetative endocarditis was diagnosed in the right atrioventricular valve. *Pseudomonas* sp was cultured from the thrombus on the valve.

## Pigs

Six well grown weaned pigs were sourced from a Canterbury pig farm for experimental purposes. On arrival they were briefly anaesthetised, examined and a nose ring inserted. Two were found to have heart murmurs. Next day one of the affected pigs was found to be off-colour and within two days it was found dead. A necropsy showed it had died from acute congestive heart failure. A large vegetative growth was attached to the left atrioventricular valve. *Streptococcus suis* was cultured in pure growth from the lesion.

## Dogs

A male Japanese Akita from Hamilton was sent for postmortem examination after a short period of severe neurological signs. There was mild congestion of the mucous membranes and the lungs were congested and oedematous. There were subpleural ecchymotic haemorrhages on the thoracic wall and petechial haemorrhages in the pericardium and the epicardium. Histologically the cortex was oedematous and perivascular cuffing was widespread in all sections of brain examined. There was also some neuronal degeneration and necrosis in the cortex and hippocampus. Severe **granulomatous meningoencephalomyelitis (GME)** and acute cortical oedema and polioencephalomalacia were diagnosed. The cause of GME is unknown. A T-cell mediated delayed type hypersensitivity of an organ-specific autoimmune disease is suspected. There were 22 recorded cases up to 1983. (Alley MR, Jones BR, Johnstone AC. Granulomatous meningoencephalomyelitis of dogs in New Zealand. *New Zealand Veterinary Journal* 31,117-19. 1983.)

A four-year-old male golden retriever from Horowhenua showed signs of weight loss, colitis and haematuria. Haematology showed a neutropenia, presumed to be a result of peracute inflammation. There were no significant biochemical changes. A faecal egg count revealed 30,000 *Trichuris* epg.

## Cats

A 16-year old DSH cat from Lower Hutt presented with multiple skin nodules ranging in size from 5 mm to 30 mm. A scraping from the head revealed huge numbers of acid fast rods within large macrophages. The distribution of the lesions suggests a *Mycobacterium lepraemurium* infection of **feline leprosy**.

A ten-year-old DSH cat from Wanganui had persistent weight loss. The tissue on the thorax had many small nodules. The cat had been diagnosed as hyperthyroid in mid 2005 but samples in February 2006 still showed increased T4 concentrations and other abnormal results including a neutrophilia. A fine needle aspirate showed cells consistent with a carcinoma, probably a **bile duct carcinoma** causing cholestasis and increased serum AP concentration. Neoplasia affecting biliary regions accounted for the persistence of elevated AP after treatment for hyperthyroidism. There was either little hepatocellular damage or loss of hepatocytes because despite large numbers of neutrophils and neoplastic cells present, serum ALT concentrations were never very high and were normal in the last

serum sample analysed. However, there are rare tumours that produce a cytokine (colony stimulating factor) that stimulates granulopoiesis as a neoplastic syndrome, and this can lead to a marked leukocytosis.

## Birds

A Wairarapa lifestyle farmer kept about 15 hens for egg production. The hens were semi free range and fed pellets. An occasional bird became listless, anorexic, developed diarrhoea and died. The owner had treated the birds for coccidia. One recently dead bird submitted for postmortem was in average condition with a prominent keel and protruding cloaca. Inside the cloaca was a 45 x 40 x 30 mm soft white mass extending from the cloacal wall into the opening partially occluding the oviduct and rectum. Its centre contained abundant inspissated white necrotic debris. These findings were consistent with a tumour of the cloaca, the location and gross appearance suggesting a **lymphosarcoma**.

One-year-old hens on a Manawatu poultry farm were dying with peritonitis. Culture of the spleen of two birds isolated a pure colony of *Pasteurella multocida*.

Two female **guinea fowl** from a group of 60 in the Waikato died. One for postmortem was in good condition but the carcass was pale. The oesophagus and crop had a thickened mucosa with a white diphtheritic membrane on the surface and contained numerous long fine worms consistent with capillaria species. There was a small amount of watery food in the crop and gizzard. Histology revealed marked hyperplasia of the crop epithelium. Numerous sections of mature nematodes were present within the epithelium and some sections contained bi-operculate eggs. In a second case (also from the Waikato) three birds of 12 died after a period of illthrift and inappetence. Tissues from one that had an inflamed proventriculus were sent to the lab and then a carcass a few days later. The female bird was thin with wasting of the pectoral muscles. The oesophagus, crop and proventriculus had thickened walls with white diphtheritic membranes. There was little ingesta in the gizzard and intestines. The faeces were fluid. The histology in both of these latter two birds was the same as in the previous case. Severe parasitic ingluvitis with secondary bacterial invasion was diagnosed. The nematodes were probably *Capillaria* spp that had grown to maturity causing only minimal reaction but the release of eggs had caused an acute inflammatory response.

A sick one-year-old hen from a backyard flock of four in Taranaki was quiet, had a pale comb, was anorexic and had a dirty vent. A blood sample showed a marked leukocytosis, most likely from a myeloid leukaemia and probably caused by **avian leucosis**. This virus is endemic in New Zealand and may be associated with a variety of tumours. The retrovirus causes a variety of tumours and may also cause a heterophilia, lymphocytosis and monocytosis with mature cells rather than immature cells present in circulation.

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