Table 1. Summary of ideal biomarker characteristics.

Characteristics of a Biomarker
Accurate, sensitive and specific for disease state
Biomarker unaffected by unrelated disorders
Reliable quantification of the biomarker from accessible body fluid or tissues
Abundance of biomarker not subject to wide variation in general population
Measurements reproducible and consistent in different circumstances at different times
Biomarker results easy to interpret

Table 1 Summary of ideal biomarker characteristics.

Table 2. Considerations in biomarker validation.

Sources of Variability	
Biological	**Analytical**
Species and breed of animal	Type of specimen
Sex	Type of sample
Age	Sample collection
Neuter status	Temperature of storage
Hormonal status and pregnancy	Duration of storage
Diurnal variation	Type of assay
Diet	Sensitivity of assay
Animal handling and environment	Specificity of assay

Table 2 Considerations in biomarker validation.

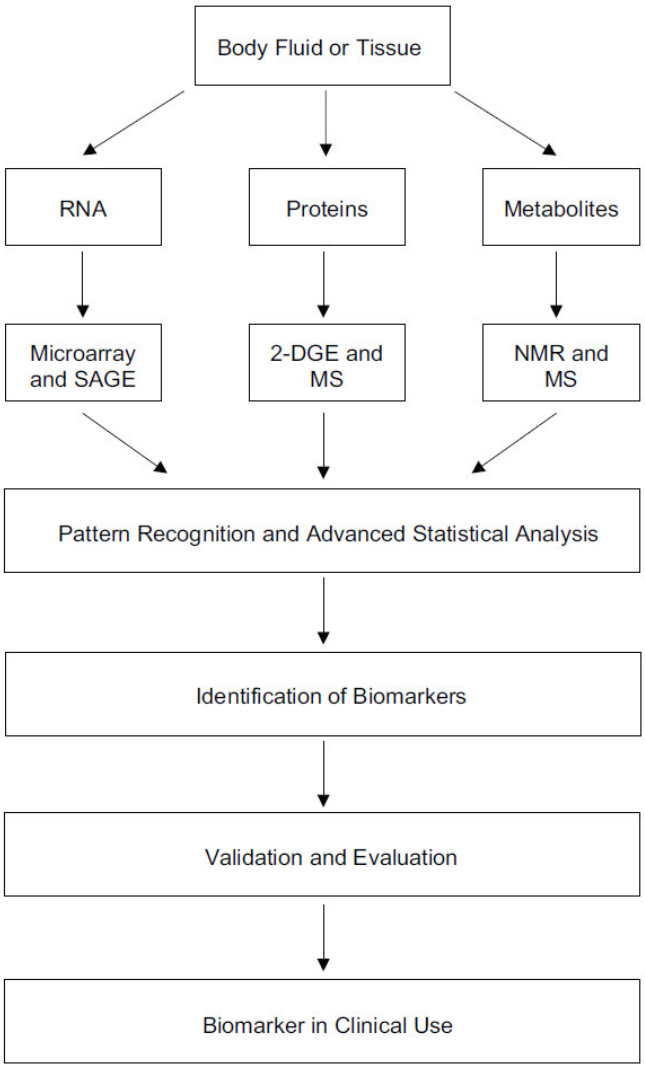

Figure 1Post-genomic approaches to biomarker discovery. Post-genomic technologies have provided new avenues for biomarker discovery. Biological fluids and tissues hold a wealth of information at the transcript, protein and metabolite level which may be able to characterize disease states in animals. The identification of diagnostically relevant biomarkers requires rigorous validation before use in the clinic.

Table 3. Example applications of post-genomics technologies to animal health and disease.

Animal	Application	Body Fluid or Tissue	Reference
Transcriptomics			
Chicken	Marek's disease	White blood cells	Liu et al. 2001
Cow	Parasite tolerance	White blood cells	Berthier et al. 2003
Cow	Mastitis	White blood cells	Park et al. 2004
Cow	Johne's disease	White blood cells	Skovgaard et al. 2006
Dog	Osteoarthritis	Cartilage	Burton-Wurster et al. 2005
Dog	Pancreatic acinar atrophy	Pancreas	Clark et al. 2005
Dog	Dilated cardiomyopathy	Heart	Oyama and Chittur, 2005
Dog	Cancer	Brain tumor	Thomson et al. 2005
Dog	Renal disease	Kidney	Greer et al. 2006
Horse	Osteoarthritis	Cartilage	Smith et al. 2006
Pig	Pathogen detection	Porcine pathogens	Liu et al. 2006
Sheep	Disease resistance	Duodenum	Keane et al. 2006
Proteomics			
Cow	Follicular cysts	Follicular fluid	Maniwa et al. 2005
Cow	Peripartum health diagnosis	Serum	Cairoli et al. 2006
Fish	Cancer	Plasma	Ward et al. 2006
Horse	Infection biology	Serum	Roncada et al. 2005
Horse	Connective tissue injury	Tendon	Sodersten et al. 2006
Pig	Respiratory infection	Bronchoalveolar lavage fluid	Hennig-Pauka et al. 2006
Sheep	Copper toxicosis	Liver	Simpson et al. 2004
Metabolomics			
Cow	Monitoring steroid use	Urine	Dumas et al. 2005
Dog	Liver disease	Plasma	Whitfield et al. 2005
Fish	Cancer	Liver	Stentiford et al. 2005

Table 3 Example applications of post-genomics technologies to animal health and disease.