

The formulae $\frac{\partial U_i}{\partial x_i} + \frac{\partial}{\partial x_j}(\rho_j U_j) = -\frac{\partial P}{\partial x_i} + \frac{\partial}{\partial x_j}(\mu \frac{\partial U_j}{\partial x_i}) + g_i(\rho - \rho_s)$ for building $\frac{\partial}{\partial x_j}(\rho_j U_j) = -\frac{\partial P}{\partial x_i} + \frac{\partial}{\partial x_j}(\mu \frac{\partial U_j}{\partial x_i} - \rho_j u_j^2) + g_i(\rho - \rho_s)$ state of the art $\frac{\partial}{\partial x_i}(\rho_j U_j) = \frac{\partial}{\partial x_i}(\lambda \frac{\partial T}{\partial x_i} - \rho_j u_j^2)$ biomedical research facilities.

Veterinary Surgical Suites, Part-I

The veterinary surgical suite is a critical component of an animal research program. This suite may consist of one or more operating rooms and their support spaces, all designed and operated with the intent to maximize the effectiveness of the infection control program. Surgical suites require stringent sanitation and decontamination, which are executed by Standard Operating Procedure (SOP) on a regular basis and as needed to remove and neutralize pathogens. The materials of construction and detailing must be resistant to degradation from regular exposure to harsh cleaning and sanitizing chemicals. Personnel are a major source of microbial organism load, so reduction of personnel movement should be integral to the design; this can be achieved by including elements like intercoms, pass-through chambers, interior glazing, etc. The focus of this article series is on the relatively uncommon large animal surgical suite, which allows for a fuller exploration of the issues and best practices of this use type, but also includes commentary on the more typical procedure rooms where small animal surgeries are performed on downdraft tables or in biological safety cabinets (BSC)s.

Design Around Workflows: The surgical suite is designed around a workflow that maximizes unidirectionality of animals and staff from clean to dirty spaces, including:

Personnel Flow: Personnel enter the Operating Room (OR) via the Scrub Room, where they don clean surgical scrubs, bouffant, mask, and booties (and/or dedicated OR plant shoes, depending on facility SOP). Immediately outside the OR, provide a scrub sink for personnel to appropriately scrub their hands and arms prior to aseptic gowning and gloving (an SOP-specified handwash dispenser shall be provided in this area, as required). Provide a door from the Scrub Room directly into the OR that is configured for hands-free operation. In small animal operating rooms (often dual-function procedure rooms provided with downdraft tables or BSCs), the scrub area may be a vestibule connected to the OR (where allowed by regulation), but in such cases the space must be negatively pressurized to ensure particles released by gowning and scrubbing are exhausted, thereby minimizing the risk of migration toward the operating table.

Animal Flow: This flow is generally from the Animal Holding Room to a Surgical Prep Room immediately adjacent to the OR. The OR, Prep, and Recovery rooms must be sized and configured to accommodate the largest anticipated animal in the facility. The Prep Room must be designed to facilitate anesthetizing, clipping the body part where the surgical incision will be made, and performing rough prep. Proximity to diagnostic

imaging is often necessary for preoperative imaging (common), though in some programs interoperative (rare) and postoperative imaging (common) are also required. Transport time and distance between support spaces should be minimized to reduce the risk of infection and the amount of time animals spend under anesthesia. In large animal OR suites, a postoperative Recovery Room should be provided with space and cages sufficient for the size, type, and number of animals. The Recovery Room should be staffed or located near where monitoring staff are stationed and should be designed to accommodate emergency care supplies and equipment, including anesthesia equipment, to respond to any postoperative complications.

Material and Equipment Flows: These flows should be segregated from the OR to the extent practicable. In a large animal OR, the Clean Utility Room should abut the OR and be connected to it by an active pass-through chamber. The Clean Utility Room should be stainless steel, with glass-fronted storage to support kitting equipment and materials needed for the surgery, which are put into the pass-through chamber where staff in the OR will retrieve it both pre- and intraoperatively. Post-surgery, tools and other reusable surgical equipment are sent to the Dirty Utility Room for cleaning and wrapping before being processed through a pass-through sterilizer into the Clean Utility Room for storage. In small animal ORs, the surgical supply functions may be co-located within.

This discussion of veterinary surgical suite design considerations will continue next month with the conclusion of this article.

References

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