HUMIMIC MEDICAL

Humimic SimuGel™ Tissue Selection Guide

Choose the right SimuGel formulation for the tissue you want to simulate

1. About the SimuGel platform

SimuGel is a family of six synthetic tissue materials, numbered #0 through #5. Each formulation has a different firmness, giving you a full range of tissue feel from firm cartilage to ultra-soft brain tissue.

The six formulations work together as one calibrated system. SimuGel #0 is the baseline. Each step (#1, #2, #3 and so on) is progressively softer, through to SimuGel #5, the softest.

Every batch of SimuGel performs the same way as the batch before it. Each unit ships with a Certificate of Analysis confirming it meets specification.

2. Tissue selection

Use Section 2a to match a formulation to a body tissue. Use Section 2b to match a formulation to a model function or application, such as embedded vessels, palpable lesions, or procedure-specific models. The recommended formulation is the best starting point. The alternate is a good second option if a different response is wanted.

Skin and surface tissue

SimuGel phantoms are typically built from a single formulation, so the surface the instrument enters is the same material as the body of the model. The surface response, how the material accepts an instrument and closes around it, comes from the formulation chosen for the model. SimuGel #0 provides a durable, high-use surface for repeated instrument work and ultrasound-guided needle placement. SimuGel #1 provides a softer surface response. Because skin is the surface of the model rather than a target, it is not listed in the tissue table below.

2a. By target tissue

Target tissue	Recommended formulation	Alternate
Connective tissue and muscle		
Cartilage and dense fibrous tissue	**SimuGel #0**	SimuGel #1
Tendon and ligament surroundings	**SimuGel #0**	SimuGel #1
Skeletal muscle, dense	**SimuGel #1**	SimuGel #0
Skeletal muscle, average	**SimuGel #2**	SimuGel #1
Cardiac muscle (anatomical, surgical handling)	**SimuGel #1**	SimuGel #2
Thoracic		
Lungs (anatomical phantom, thoracic procedures)	**SimuGel #2**	SimuGel #3
Abdominal organs		
Liver	**SimuGel #4**	SimuGel #5
Kidney	**SimuGel #4**	SimuGel #3
Spleen	**SimuGel #4**	SimuGel #3
Pancreas	**SimuGel #3**	SimuGel #4
Intestine	**SimuGel #4**	SimuGel #3
Reproductive and pelvic		
Fibroglandular breast tissue	**SimuGel #2**	SimuGel #3
Breast bulk and fatty breast tissue	**SimuGel #4**	SimuGel #3
Prostate tissue	**SimuGel #2**	SimuGel #3

Target tissue	Recommended formulation	Alternate
Cervix tissue	**SimuGel #2**	SimuGel #3
Postpartum uterus	**SimuGel #2**	SimuGel #3
Adipose and soft tissue layers		
Subcutaneous fat	**SimuGel #4**	SimuGel #5
Deep adipose tissue	**SimuGel #4**	SimuGel #5
Specialty soft tissue		
Brain tissue	**SimuGel #5**	SimuGel #4
Spinal cord surroundings	**SimuGel #4**	SimuGel #5
Neonatal soft tissue	**SimuGel #5**	SimuGel #4
Blood clot analog	**SimuGel #5**	SimuGel #4

Find the right formulation for your application

These recommendations are starting points based on tissue response and common training use. Human tissue properties vary widely by patient, age, anatomy, condition, and measurement method, and every model and procedure has different requirements. Because of this, the best formulation for your application depends on your specific needs. If you are unsure which formulation is right for your application, the SimuGel Reference Kit allows your team to compare the full formulation range side by side.

2b. By application type

Application type	Recommended formulation	Notes
High-use target training	**SimuGel #0**	Durable baseline for ultrasound and needle-guided target practice
Embedded vessels and targets	**SimuGel #0 (alt #1)**	Bulk material surrounding vessels, tubes, or targets
Palpable lesions, firm	**SimuGel #0 or #1**	Firm inclusions for palpation and imaging
Palpable lesions, soft	**SimuGel #2 or #3**	Soft inclusions for palpation and imaging

Application type	Recommended formulation	Notes
Anatomical and procedure-specific models	**Starts from SimuGel #0**	Built for a specific procedure, selection adjusts to the procedure
Medical device R&D and evaluation	**Matched to tissue under evaluation**	Observing device interaction, performance, and tissue response during development and testing

3. Formulation summary

Each SimuGel formulation at a glance.

Formulation	Relative compliance	Use this for	Also good for
SimuGel #0	**Baseline**	High-use skin and surface training, IV access, injection, ultrasound-guided needle placement, cartilage, dense fibrous tissue, bulk material for embedded vessels and targets	Dense muscle, structural phantom backbone, firm lesion inclusions
SimuGel #1	**Lower resistance**	General adult skin and surface response, dense skeletal muscle, cardiac muscle (anatomical)	Incision and cutting practice, IM access, catheter placement
SimuGel #2	**Medium-soft**	Fibroglandular breast, prostate, lungs, postpartum uterus, average muscle	Imaging-guided biopsy, OB/GYN training, soft lesion inclusions
SimuGel #3	**Soft**	Glandular tissue, pancreas, higher-compliance procedural models	Soft uterine state, fine needle work, soft inclusions
SimuGel #4	**Very soft**	Subcutaneous fat, breast bulk, liver, kidney, spleen, intestine	Palpation training, abdominal phantoms, soft organ analogs
SimuGel #5	**Ultra-soft**	Brain tissue, blood clot analog, neonatal soft tissue	Highly compliant inclusions, soft organ cores, ultra-soft components

4. Custom multi-formulation phantoms

Two or more SimuGel formulations can be combined in a single phantom to mimic complex tissue. Humimic Medical engineers these as custom models using proprietary methods.

5. How SimuGel performs

SimuGel is built to last through hundreds of training sessions. Each formulation delivers predictable performance, so users can select based on tissue response rather than material variability.

Each SimuGel formulation gives you a different level of resistance to needles, hands, and instruments. This is what lets you match the right SimuGel to the tissue feel your development or training needs.

All six formulations work with ultrasound and image like soft tissue on screen, backed by validated acoustic data.

6. Technical specifications

Mechanical and acoustic property data for each SimuGel formulation, including batch variance, Young's Modulus, needle resistance, firmness, density, speed of sound, acoustic impedance, and attenuation values across clinical frequencies, are published in the Humimic SimuGel Technical Documentation. This data supports device validation, regulatory submissions, and detailed phantom design work.

7. Important disclaimer

SimuGel is for external training and simulation use only. SimuGel is not for use inside the human body, for medical procedures on patients, or for implantation. Recommendations in this guide are intended to help you choose the right formulation for training applications. They are not medical or clinical advice.

Humimic Medical. Greenville, South Carolina. Made in USA.