

Paragraph

DEP is a common technique of manipulating cells by generating a polarizing force in a nonuniform electric field [72]. The electric field gradient is generated by arranging metal electrodes on the microfluidic devices. The field stress applied to the cell causes it to move toward high or low field density regions. The integration of DEP and microfluidic devices has been successfully applied to manipulate cells for biology and medical research [73].

One of the most common applications of DEP integrated with microfluidic devices is to pattern or capture cells on the chips. With the cooperation of the microstructure on the chip and the electric field generated by the microelectrodes, the cells can be orderly arrayed at the single-cell level, as well as be precisely controlled [74]. Wu's group developed a DEP-based chip for high-throughput cell trapping and pairing [75]. The two-pair interdigitated array electrode guaranteed a high cell pairing efficiency. This method has shown its function in studying precise cell fusion and cell-cell communication. Wang's team proposed a DEP-based 3D cell manipulation method (Fig. 5.5E) [64]. The single cell could be rotated by using four sidewall electrodes and one transparent bottom electrode to generate the rotating electric fields. Therefore, this method could provide a 3D view of multiple biophysical property measurements.

Paragraph

[What](#) personalized learning systems are available now?

Web-based education systems are already common. Systems have been designed for storing instructional content, delivering it to students, and facilitating the interaction between instructors and learners. Multimedia modules of information can provide text, audio, video, animation, or static graphics in any order suitable for the student.

The delivery of instructional material is an important part of personalized learning. For example, different sequences are used in intelligent tutoring systems to deliver content tailored for each individual. Aspects of this approach may include the use of pre-assessments to gauge an individual's most effective learning habits. The information collected can then be used to modify the sequence of material presented.

Many methods for optimizing the order of presentation have been explored. One novel approach, used in other fields to solve complex problems, is the mathematical method known as the genetic algorithm (so named because of its similarity to evolutionary natural selection). It eliminates unsuccessful presentation sequences and modifies successful ones for a new round of tests, in which the least successful are again eliminated and the best are modified once more.

Paragraph

[The stability theory](#) presented here was developed in a series of papers ([6]-[9]). The purpose of this paper is to refine the fundamental theorems and to provide proofs for results which previously had only been stated. The applications of this theory have been discussed and illustrated in the above-mentioned references and in [5]. For a discussion of and references to the exploitation of the “invariance principle” used here see [d] and [9]. For difference equations and applications to numerical analysis see [4]. In order to see how much is gained when it is known that the limit sets of solutions have an invariance property and for completeness we give first in Section 2 the best result we know for locating limit sets of nonautonomous systems. This result is an improvement of a theorem given by Yoshizawa in [IZ]. Section 3 is for autonomous ordinary differential equations, and from Theorems 2 and 3 follow all of the classical Liapunov results on the stability and instability of these systems.

Paragraph

[Abatacept](#) is a recombinant [fusion protein](#) that features the extracellular portion of cytotoxic T lymphocyte–associated protein 4 (CTLA-4). As such, it binds to CD80 and CD86 on antigen-presenting cells to impede engagement of the costimulatory molecules with CD28 on T cells, therefore inhibiting delivery of the second activation signal. Abatacept has shown efficacy for treating patients with *CTLA4* and *LRBA* deficiencies.^{50,51} The medication carries a relatively safe adverse event profile. No significant increase in serious or overall infections has been reported with its use. It is not recommended for use with other biologic modifiers, such as TNF- α inhibitors and anakinra, because addition of [abatacept](#) to these medications has been demonstrated to correlate with an almost twofold increase in serious adverse events (22.3% with abatacept vs. 12.5% without abatacept) and a 3.6-fold rise in serious infections (5.8% with abatacept vs. 1.6% without abatacept).⁵² Nonetheless, it bears no FDA black box warning, unlike [belatacept](#), another CTLA-4 fusion protein that differs from abatacept by only two amino acids and that has warnings concerning [posttransplant lymphoproliferative disorder](#) and increased susceptibility to infections, among others (Table 70.3).

Paragraph

6.5 Abandoned Wells

Through 2017, 52,964 wells have been drilled in the GoM and 27,405 wells have been permanently abandoned, leaving remaining well inventories circa 2017 at 25,559.

Permanently abandoned (PA) wells represent the final state of a [wellbore](#), while temporarily abandoned (TA) wells represent a [transitory state](#) for wells on their way to production or permanent abandonment.

There are many different pathways that wells may follow during their lifetime depending on why they were drilled, where they were drilled, how they were drilled, and whether the well was a keeper (successful) or not (Fig. 6.8). After wells are drilled, they are temporarily abandoned before structures are installed to protect the wellbore or subsea equipment is ready to handle production. Producing wells that cease production for a long period of time may also be temporarily abandoned if the operator expects to utilize them in the future (e.g., for a sidetrack) or if they are waiting to be permanently abandoned. Permanent abandonment is the final state of all wells. Whenever a sidetrack is drilled, it will create a new well and forward path.

Paragraph

[Abdominal actinomycosis](#) is a chronic, localized inflammatory process that can occur weeks, months, or years after the integrity of the gastrointestinal mucosa is breached by surgery or trauma.

Acute [appendicitis](#) with perforation, perforated [colonic diverticulitis](#), and emergency surgery for trauma to the lower intestinal tract are among the predisposing factors. Extension from the thorax or pelvis or through hematogenous dissemination can also occur. The ileocecal region is involved most frequently (usually after appendicitis with perforation) with the formation of a mass lesion. The infection extends slowly to contiguous organs, especially the liver, and may involve retroperitoneal tissues, the spine, or the abdominal wall. Hepatic, renal, or splenic dissemination is an uncommon complication.

Persistent draining sinuses may form, and those involving the perianal region can simulate [Crohn's disease](#) (Chapter 143) or [tuberculosis](#). The extensive [fibrosis](#) of actinomycotic lesions, recognized by the examiner as a mass, often suggests tumor. A frequent finding on [computed tomography](#) (CT) is an infiltrative mass with dense inhomogeneous contrast medium enhancement. Constitutional symptoms and signs are nonspecific, the most common being fever, diarrhea or constipation, weight loss, nausea, vomiting, pain, and sensation of a mass.

Paragraph

2.2.1.4 Bone

Thermal ablations are under investigation and hold considerable promise for the treatment of osteosarcoma and metastatic bone tumors. Metastatic bone tumors arise in over 50% of cancer patients and are associated with persistent and disabling pain that is frequently refractory to radiotherapy, chemotherapy, and analgesics [65]. For FUS treatments, the high attenuation and acoustic impedance of bone makes penetration and focusing challenging; but at the same time, high absorption and low thermal conductivity permit the rapid elevation of temperature.

Primary neoplasms may be associated with cortical degradation, which can facilitate ultrasound access. Results have been reported for osteosarcoma ablation under ultrasound guidance, in combination with neoadjuvant therapy, for limb salvage as well as for palliative purposes [66].

Clinical studies employing MRI-guided FUS for the palliative treatment of bone metastases—where periosteal nerve destruction is sought for metastases present in the superficial aspects of bone—have been effective [67]. Similarly, bone tumor ablation using invasive probes has been shown to be effective [65,68].

Paragraph

Acculturation influences parenting behaviors, the ways cultural values are expressed, the adaptations parents make in response to their host culture environments, and the ways in which they transmit their heritage culture while socializing their children to function in the host culture.

Varying levels of acculturation among family members in immigrant families can result in an acculturation gap between parents and children that influences children's mental health outcomes in both positive and negative ways.

Linguistic acculturation differences between immigrant parents and children can also result in adolescents functioning as translators (language brokers) for their English-limited parents, with subjective appraisals of the language-brokering experience providing more consistent evidence for its effects on adolescent outcomes.

We present evidence for the conditions under which parenting behaviors, acculturation gap, and language brokering may represent sources of risk or protection for adolescent mental health in Latinx and Asian immigrant families by using examples from research on Chinese and Mexican immigrant families.